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A NEW PUBLIC POLICY DIRECTION FOR ONTARIO HYDRO

FINAL REPORT OF THE
SELECT COMMITTEE OF THE LEGISLATURE
INVESTIGATING ONTARIO HYDRO

JUNE, 1976

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JUNE, 1976

TO: The Honourable Russell D. Rowe,
Speaker of the Legislative Assembly of the Province of Ontario:

Sir:

We, the undersigned members of the Committee appointed by the Legislative Assembly of the Province of Ontario on October 30, 1975, to review Ontario Hydro's proposals to increase bulk power rates for 1976, together with the report of the O.E.B. to the Minister of Energy thereon under section 37a of The Ontario Energy Board Act, dated October 10, 1975, and such other information as the Committee may consider relevant for its purpose, in light of the anti-inflation program of the Government of Canada; and the Ontario commitment to that program; and to prepare and submit a report before the end of December 1975*, advising the Legislature whether, in the opinion of the Committee, such rate increase proposals are in keeping with or supportive of the anti-inflation program of the Government of Canada and the Ontario commitment to that program; and consistent with Ontario Hydro's obligation to provide power at cost; and if not, to report to the Legislature, with its recommendations, have the honour to submit the attached Final Report.

Donald C. MacDonald

Donald C. MacDonald, M.P.P.
York South,
Chairman

Ian Deans, M.P.P.
Wentworth

Frank Drea

Frank Drea, M.P.P.
Scarborough Centre

John Eakins, M.P.P.
Victoria-Haliburton

Evelyn Gigantes

Evelyn Gigantes, M.P.P.
Carleton East

Larry Grossman, M.P.P.
St. Andrew-St. Patrick

Raymond L. Haggerty

Ray Haggerty, M.P.P.
Erie,
Vice Chairman

John Lane, M.P.P.
Algoma Manitoulin

Julian Reed, M.P.P.
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George R. McCague

George McCague, M.P.P.
Dufferin-Simcoe

James Renwick

James A. Renwick, Q.C., M.P.P.
Riverdale

Douglas

Douglas M. Wiseman, M.P.P.
Lanark

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* - later extended to May 31, 1976

THE SELECT COMMITTEE INQUIRING INTO HYDRO'S PROPOSED BULK POWER RATES

THE LEGISLATIVE ASSEMBLY OF ONTARIO

FIRST SESSION: THIRTIETH PARLIAMENT

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Ray Haggerty, M.P.P., Vice Chairman	Erie
Ian Deans, M.P.P.	Wentworth
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Douglas J. Wiseman, M.P.P.	Lanark

STAFF

Counsel:	Alan M. Schwartz	Siegal, Fogler Barrister and Solicitors
Consultants:	James D. Fisher David R. Jolley	The Canada Consulting Group
Clerk of the Committee	Andrew Richardson	

During the course of Committee's hearings Messrs. Bullbrook, Peterson, Williamson and Maeck were replaced by Messrs. Eakins, Reed, McCague and Lane.

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A NEW PUBLIC POLICY DIRECTION FOR ONTARIO HYDRO

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Summary and Recommendations

Summary and Recommendations

PART I

SUMMARY AND RECOMMENDATIONS

The Select Committee investigating Ontario Hydro was established by the Legislative Assembly of the Province of Ontario to consider a proposed increase of some 25 percent in the price of bulk or wholesale electric power by Ontario Hydro. The Committee's terms of reference directed it to consider a recommendation by the Ontario Energy Board that an increase of 26.7 percent be granted, as well as the new Anti-Inflation Program just then announced by the Government of Canada that would limit the annual increase in personal incomes to between 8 and 12 percent.

Under the Chairmanship of Mr. D.C. MacDonald (York South), the Select Committee held about 100 meetings over the past eight months. Individuals and organizations were invited by a public advertisement to express their views on the proposed increase. Evidence was heard from Ontario Hydro, the Government of Ontario, specific experts and various interest groups. The hearings were divided into two sessions. The first session was an intensive five weeks of almost daily hearings culminating in an interim report tabled in the Legislature on December 12, 1975. Following a Christmas break, the second session of regular three-day-a-week hearings was held from January into June of 1976.

In the first session, the Committee reached three important conclusions. First, Ontario Hydro's system expansion plan required close scrutiny by the Legislature because, over time, the most significant impact on Hydro's rates results from its plans to spend over $30 billion in the next decade on the expansion of generation and transmission facilities. In addition, the critical assumptions on which the expansion program is based are fundamentally socio-economic-political rather than technical. Second, the Committee required more time to examine, fully and critically, the components of Hydro's costs. Ontario Hydro is one of the largest organizations in Canada, and its costs could not begin to be assessed in a few days of hearings. Third, in keeping with the broad spirit of the fight against inflation, the Committee concluded that a responsible rate reduction was justified and necessary. In computing the amount of the reduction, the Committee concluded that a cut of about $30 million in Hydro's internally generated capital was appropriate. This cut would reduce the margin of interest coverage afforded Hydro's investors by a small amount but would still allow an improvement to be forecast over the 1975 levels of interest coverage.

These three conclusions formed the basis for an interim report presented to the Legislature on December 12, 1975 recommending an extension of the Committee's term and an interim rate increase of 22 percent. The Government accepted the Committee's recommendations, and the second session followed. This first part of the Committee's final report will summarize the conclusions and recommendations of the Committee set out in the three parts that follow.

SUMMARY OF PART II

GROWING PUBLIC INVOLVEMENT WITH ONTARIO HYDRO

Part II of the report sets the Select Committee's investigation of Ontario Hydro in the context of a long history of Hydro involvement with the public. The corporation (originally known as the Hydro-Electric Power Commission of Ontario) was conceived at the turn of the century, in the ferment of public activity that included marches on Queen's Park and many meetings between the municipal and provincial leaders of the day. Ontario Hydro grew and developed as a public institution into one of the largest public utilities in the world, gaining a well-earned reputation for its technical competence and progressive approach.

As energy technology and Ontario's needs change, Ontario Hydro could expand into energy-related fields beyond the generation and distribution of electricity. For example, it may become involved in district heating and the development of solar energy.

Over much of its history, the relationship between the corporation and the public was quiet and contained. In the 1970s, there has been a surge of new public involvement and interest in Hydro. Important recommendations of Task Force Hydro and the Advisory Committee on Energy in 1972 led to Hydro becoming a Crown corporation, with a publicly appointed board, reporting to the Legislature through a new Ministry of Energy, and its rates as well as other aspects of its operation being subject to public review by the Ontario Energy Board. Generation and transmission line siting are now subject to public hearings. A Royal Commission on Electric Power Planning is examining the process of planning for the period 1[illegible]3 to 1993.

Perhaps the most significant change came early in the current year when the Provincial Treasurer announced that the Government had placed limits on Hydro's planned borrowing. The combined borrowing of Hydro and the Province had, in the Treasurer's opinion, approached the limits of prudence. Now, for the first time, Hydro's expansion plans were to be determined by the amount of capital it could borrow rather than the needs of the system.

The Committee saw its investigation as a natural outgrowth of increasing public participation and an increasing need for firm government policy direction to Ontario Hydro. The explosion of public involvement in the 1970s is symptomatic of the new era in which Hydro finds itself. And yet, while the public and Government are increasingly involved with Hydro, there is no single forum or combination of forums that provides an overall public policy direction. It is this need - as well as the review of the bulk power rate - that the Committee has tried to meet, but an ongoing direction will be needed.

The Committee recommends that:

II-1 THE ONTARIO GOVERNMENT DEVELOP AND CLEARLY ARTICULATE GOVERNMENT POLICY TOWARDS ONTARIO HYDRO.

SUMMARY OF PART III

NEW OBJECTIVES FOR ELECTRIC POWER PLANNING

This part of the report deals directly with Hydro's current system expansion plan and the critical assumptions and policies that underlie it. It is divided into four chapters. The first chapter examines the future demand for electrical energy, and concludes that specific targets should be set for generation planning based on a natural demand growth that will be lower than the historic trend, specific conservation objectives to reduce the continued waste of electric energy, and a load management program that reduces the annual peak need for which generation is built. The second chapter considers the reliability of the planned generation system. In this chapter, the Committee concludes that Hydro must develop a better measure of reliability, and that, for now, it should maintain the current planning standard but place a value on the interconnecting tie-line system. In the third chapter the demand and reliability targets are brought together to show that Hydro should be developing a new generation plan considerably scaled down from the current plan. The Committee recommends that the new generation plan include a critical re-examination of the current planned generation mix. Finally, in the fourth chapter, the Committee turns to the critical question of a follow-up mechanism to ensure that its recommendations are implemented.

CHAPTER III-1

SETTING TARGETS FOR LOAD GROWTH

The first step in system expansion planning is to determine the level of future demand that must be serviced. To determine that level of demand, the Committee considered the "natural" demand for electrical energy, recommended more effective conservation programs and set targets for a new load management approach.

FORECASTING THE DEMAND FOR ELECTRIC POWER

The Committee saw that, historically, the actual consumption for electrical energy deviated only slightly from a very long-term trend of about 7 percent annual growth. However, Hydro and other witnesses pointed out that many of the variables that should have a significant impact on future demand have changed abruptly in the last few years. The rates of population growth and household formation may be slowing; the long-term decrease in the relative price of electrical energy has been reversed; wasteful use of energy is being moderated by a new conservation "ethic" encouraged by government and utility programs. Hydro's load forecasting technology captures these new factors through a very subjective process. While that process has been relatively accurate in the past, it is not capable of specifically identifying and explaining the impact of key variables.

The Committee recommends that:

III-1 ONTARIO HYDRO DEVELOP AN ECONOMETRIC FORECASTING MODEL THAT WILL ACCOUNT FOR ALL QUANTIFIABLE VARIABLES THAT CAN BE ANTICIPATED TO HAVE A SIGNIFICANT IMPACT ON THE FUTURE DEMAND FOR ELECTRIC POWER.

The Committee's approach to load forecasting was to hear testimony from a wide range of experts in order to determine the "broad consensus" about future demand and compare that consensus to Hydro's load forecast. It found that both Hydro and the independent experts agree that the demand for electrical energy will be slightly below the historic trend.

The Committee recommends that:

III-2 ONTARIO HYDRO'S CURRENT LOAD FORECAST BE ACCEPTED AS THE BASIS FOR ANTICIPATING FUTURE DEMAND, GIVEN NO SIGNIFICANT CHANGES IN GOVERNMENT POLICY.

TAKING ACTION TO CURTAIL ENERGY WASTE

In looking at energy consumption in the residential, commercial and industrial sectors, the Committee became aware that a great deal of energy use is unnecessarily wasteful. If energy were used more carefully and wisely it would not be necessary to consume so much energy in maintaining our current standard of living. If wasteful energy consumption could be curtailed, some expensive generation capacity need not be built. The need for action to achieve the conservation of energy became an important area of Committee concern.

Within the residential market, there are worthwhile opportunities for saving vast quantities of energy that will, in addition, save money for the consumer. But the consumer is often either unaware of the benefit or unable to make the initial capital investment to capture it.

For example, one of the dominant features of the residential sector is the growing use of electrical space heating. Analyses showed that insulation standards for new homes are not as high as they could be, given a reasonable anticipation of future energy price. Owners of existing dwellings could save money by upgrading insulation and adding storm windows and doors, but may lack the capital to make the initial investment. Similarly, appliances use energy with widely varying efficiencies, but consumers are unable to find this information when they are considering a purchase. There is a clear need for government action to save energy and help the consumer.

The Committee recommends that:

III-3 THE ONTARIO GOVERNMENT INCREASE INSULATION STANDARDS IN ALL NEW HOMES TO A LEVEL THAT IS JUSTIFIABLE ON THE BASIS OF EXPECTED FUTURE ENERGY PRICES.

III-4 THE ONTARIO GOVERNMENT MAKE FINANCIAL INCENTIVES GENERALLY AVAILABLE TO ENCOURAGE THE INSTALLATION OF ENERGY SAVING EQUIPMENT IN HOMES THROUGHOUT ONTARIO.

III-5 THE ONTARIO GOVERNMENT PUBLICLY URGE THE GOVERNMENT OF CANADA TO SET MINIMUM ENERGY EFFICIENCY STANDARDS FOR APPLIANCES AND TO REQUIRE ALL MANUFACTURERS TO SHOW ON EACH APPLIANCE NORMAL ELECTRICITY USE RELATIVE TO THE MINIMUM STANDARD.

III-6 THE ONTARIO GOVERNMENT SET INSULATION STANDARDS THAT CAN BE JUSTIFIED ON AN ECONOMIC BASIS FOR ELECTRIC WATER HEATERS.

The Committee noted that the consumption of electrical energy in bulk-metered apartments is some 34.5 percent higher than for individually metered apartments. Hydro must act to stop bulk metering.

The Committee recommends that:

III-7 ONTARIO HYDRO AND THE MUNICIPAL UTILITIES CEASE BULK METERING APARTMENTS AND TOWNHOUSES AND STUDY THE FEASIBILITY OF RETROFITTING EXISTING BULK METERED BUILDINGS.

Finally, the Committee heard evidence that development of known technology could offer significant savings within a relatively short period of time. Examples cited included heat pumps, thermal storage and the design and siting of buildings as passive collectors of solar energy.

The Committee recommends that:

III-8 THE ONTARIO GOVERNMENT MAKE AVAILABLE ADDITIONAL RESEARCH FUNDS FOR THE DEVELOPMENT OF ENERGY SAVING TECHNOLOGY.

The growth in electrical energy consumption in the commercial sector is considerably higher than in the residential or industrial sectors. The commercial sector is so diverse that it is difficult to pinpoint specific conservation objectives, even though there is considerable evidence that the opportunities for conservation may be more substantial in this area than in any other. The examples are evident: buildings with lights kept on unnecessarily; air conditioning one side of a building and heating the other; over-air-conditioned buildings where everyone wears sweaters; unnecessary decorative lighting; poorly insulated glass towers.

One general problem might be with the tax system. Currently, fuel consumed is deductible as an annual expense, but capital investments to save energy must be capitalized and written off over several years. The commercial sector should respond to financial incentives.

The Committee recommends that:

III-9 THE ONTARIO GOVERNMENT MAKE FINANCIAL INCENTIVES GENERALLY AVAILABLE TO ENCOURAGE INVESTMENT IN ENERGY CONSERVATION-RELATED EQUIPMENT IN THE COMMERCIAL SECTOR.

In addition, the diversity of commercial structures and uses has left this sector free of any usage standard. Office buildings are one part of the sector where wasteful use of energy is very apparent and where a specific approach might be used.

The Committee recommends that:

III-10 THE ONTARIO GOVERNMENT ESTABLISH ENERGY EFFICIENCY STANDARDS AT AN ECONOMICALLY OPTIMAL LEVEL FOR ALL NEW COMMERCIAL STRUCTURES.

The industrial sector is still the largest consumer of electrical energy, although its annual growth rate is the slowest. In addition, electricity is the dominant form of energy consumed by industry. A standard approach is difficult in this sector because of the great diversity of energy use in industry and because of the fact that energy costs are such a small portion of overall industrial costs. Currently, a proliferation of Hydro, provincial and federal information and education programs is aimed generally at this sector.

The Committee noted, however, that there appears to be considerable economic advantage - as well as larger energy saving benefits - to industry in investing in energy conservation. A more concrete approach would be to highlight the economic benefits by setting up a revolving capital pool. Capital could be borrowed from the pool and repaid from the economic benefit of reduced energy consumption.

The Committee recommends that:

III-1 THE ONTARIO GOVERNMENT SET UP A REVOLVING CAPITAL POOL FOR INDUSTRY WHICH WOULD BE AVAILABLE FOR ENERGY SAVING PROJECTS.

A much larger area of potential energy saving could be in the utilization of some waste industrial heat to generate electricity (and of some waste generation heat for industrial purposes). This is an area where Government leadership is urgently required.

The Committee recommends that:

III-12 THE ONTARIO GOVERNMENT TAKE THE LEAD IN INCREASING INDUSTRIAL ELECTRICITY GENERATION.

Relating to all three sectors, the Committee heard a good deal of evidence about the use of electric rates as a conservation tool. Many witnesses urged that electricity be made more expensive in the interest of conservation. The Committee did not probe the issue of rate design because a detailed costing and pricing hearing is scheduled for the Ontario Energy Board later this year. It is, however, concerned about the overall level of rates.

III-13 THE ONTARIO GOVERNMENT ENSURE THAT THE OVERALL LEVEL OF ELECTRIC RATES SHOULD NOT BE INCREASED SOLELY FOR CONSERVATION PURPOSES.

Overall, the Committee found many areas of potential action in energy conservation. In this respect, the Committee supported Hydro's initiative of setting specific conservation targets and planning its new generation on the assumption that the targets would be met. The recommendations abcve clearly indicate that much of the need for action is with the Government rather than Hydro. Therefore, the Committee believes strongly that the targets will only be met if they are approached as a commitment by both Hydro and the Government.

The Committee recommends that:

III-14 ONTARIO HYDRO, THE ONTARIO GOVERNMENT AND THE ONTARIO ENERGY BOARD CONSIDER THE EFFECTIVE AND EFFICIENT USE OF ELECTRIC ENERGY AN ISSUE OF EQUAL IMPORTANCE TO THE CONTINUANCE OF A RELIABLE AND ADEQUATE SUPPLY. FURTHER, THAT ONTARIO HYDRO'S SPECIFIC CONSERVATION TARGETS BE ACCEPTED AS A GOVERNMENT COMMITMENT AND BE INCLUDED IN ALL SYSTEM EXPANSION PLANNING.

MANAGING THE PEAK DEMAND

One of the problems of an electric utility is that it must have sufficient capacity to meet the annual peak demand, even though the demand may reach or approach that level for only a few hours every year. Therefore, the Committee focussed its attention on the possibilities of reducing the peak.

The initial evidence was that if no action is taken, the peaking problem is likely to get worse in the years ahead. Immediate action is needed.

The Committee examined three broad areas of load management potential. Rates could be designed to encourage the shifting of some consumption to off-peak hours. Interruptible power sales to industry could be encouraged to lower the future requirements for additional generation. A third broad area involves a number of technically feasible methods that could be employed to manage peak demand. These include temporary voltage reductions, electrical load control, and "load-shedding" arrangements with industry and controllable water heating loads.

The Committee recommends that:

III-15 ONTARIO HYDRO CONSIDER THE DESIGN OF ITS RATES TO BE AN IMPORTANT TOOL IN FURTHERING REASONABLE LOAD MANAGEMENT OBJECTIVES.

III-16 ONTARIO HYDRO AND THE MUNICIPAL UTILITIES ACTIVELY PROMOTE THE SALE OF INTERRUPTIBLE POWER TO INDUSTRY AND ENSURE THAT THE PRICING OF INTERRUPTIBLE CONTRACTS REFLECTS THE REAL SAVING TO ONTARIO HYDRO.

III-17 THE ONTARIO GOVERNMENT AND ONTARIO HYDRO DEVELOP AND IMPLEMENT A LOAD MANAGEMENT PROGRAM.

The forecast of the peak is such a critical element in system expansion planning that provision must be made now for the effect of load management on the future system peak. There was very little evidence on which to base a specific forecast. Therefore, the Committee took the approach of setting a specific targets as an effective way of providing a focus and incentive for immediate action.

The Committee recommends that:

III-18 ONTARIO HYDRO DEVELOP IMMEDIATELY A PROGRAM SPECIFICALLY AIMED AT REDUCING PEAK DEMAND BY A TARGET AMOUNT OF ONE PERCENT PER ANNUM TO 1985.

CHAPTER III-2

SETTING AN APPROPRIATE STANDARD OF RELIABILITY

After determining the level of demand that must be serviced, the next task in system expansion planning is to set standards of system reliability. While the reliability of the system encompasses a number of factors, the Committee focussed on generation reliability, the most expensive part of the system, requiring the longest lead time to construct.

DEVELOPING AN UNDERSTANDABLE MEASURE OF RELIABILITY

Reliability is a concept that seems simple and straightforward, but become highly complex the more fully it is developed. First, users probably do not consider reliability as simply a matter of outages, but as a combination of factors such as the frequency, duration, timing and warning of outages. Second, neither of Hydro's standards measures reliability against these factors. Finally, Hydro's most comprehensive measure - the Loss of Load Probability (LOLP) - cannot easily be compared to a similar measure used by other utilities because each utility appears to include or exclude different key variables. And, the LOLP calculation does not include uncertainties in bringing new plant into service on time and variations in the frequency and duration of time the plants are out of service.

Without an understandable, reasonably comprehensive measure, it is difficult for the public, the Government and the Legislature to make sense of Hydro's system expansion plans.

The Committee recommends that:

III-19 ONTARIO HYDRO DEVELOP A MEASURE OF THE RELIABILITY OF THE GENERATION SYSTEM THAT INCLUDES ALL SIGNIFICANT VARIABLES, AND INDICATES WITH THE HIGHEST POSSIBLE DEGREE OF CLARITY AND ACCURACY THE FREQUENCY, DURATION AND SCALE OF PROBABLE OUTAGES.

SETTING AN APPROPRIATE PLANNING TARGET FOR RELIABILITY

Despite the inadequacy of the current tools for measuring reliability, the Committee had to work with some standard to reach conclusions about the amount of generation that has to be built to meet the Committee's load target. In so doing, the Committee focussed on the LOLP index and Hydro's standard that, over a long period of time, generation should be inadequate to meet the load on an average of once every ten years.

The evidence shows that this planning standard is too high. First, from a customer's point of view, the cost of providing reliability at this level is higher than the benefit of having virtually no generation failures. Second, the measure relates only to the most expensive part of the system - generation. As transmissions and distribution reliability improves, generation reliability can be reduced, thereby leaving the customer in the same relative position.

The Committee was prepared to set a lower reliability standard except for the fact that two significant uncertainties are not included in Hydro's reliability calculations. These are uncertainties in meeting the new load targets and in the new generation program.

The Committee recommends that:

III-20 ONTARIO HYDRO RETAIN, AS AN INTERIM MEASURE, THE CURRENT LOSS OF LOAD PROBABILITY STANDARD OF ONE OUTAGE IN TEN YEARS.

PUTTING A VALUE ON INTERCONNECTIONS

One change that the Committee believes should be included for current planning purposes is the placement of an explicit value on the interconnection system.

For the past two years, the OEB has recommended that Hydro assign a value to interconnections, while Hydro has argued that the interconnections should not be assigned a specific value in computing generation reserve requirements. The Committee's main difficulty was in finding an appropriate value to assign.

The Committee recommends that:

III-21 ONTARIO HYDRO ASSIGN A REASONABLE VALUE TO THE INTERCONNECTION SYSTEM IN PLANNING THE NEW GENERATION REQUIRED TO MEET THE RELIABILITY STANDARD.

CHAPTER III-3

RETHINKING THE GENERATION PLAN

In the planning of new generation, there are two critical areas for decisions: the amount of new generation to be provided year by year and the mix of basic generation technologies to be used. In this chapter, the Committee makes recommendations on each of these decision areas.

SETTING NEW CAPACITY TARGETS

In the past year, Hydro's plans to add generating capacity have been scaled back considerably. In June 1975, more than $1 billion was cut from the ten-year plan; in February 1976, another $6 billion was eliminated Still, Hydro's system expansion plan is forecast to cost about $28 billion over the next ten years and the system capacity will grow from about 20,500Mw to 34,500Mw. In reviewing Hydro's generation plan, the Committee reached three important conclusions.

First, Hydro must recognize that its traditional planning process has become obsolete. Current borrowing restrictions make inoperable a planning process that treats capital requirements as an output rather than an input. With the cost of meeting future load growth increasing, a planning process that does not provide for the development of alternative ways of meeting forecast load growth, and for the balancing of the cost of outages against the cost of reserve capacity is unnecessarily wasteful.

The Committee recommends that:

III-22 ONTARIO HYDRO CHANGE ITS PLANNING PROCESS TO EMPHASIZE MEETING ONTARIO'S ELECTRICAL ENERGY NEEDS AFTER IMPLEMENTATION OF CONSERVATION AND LOAD MANAGEMENT PROGRAMS, WITH THE MINIMUM AMOUNT OF NEW GENERATION THAT IS CONSISTENT WITH SOUND PLANNING.

Second, the current system expansion plan will produce an excess of generating capacity over what is needed to meet load targets consistent with actions taken by Hydro and with certain key Committee recommendations. Hydro's new load forecast reduced the need for generation by some 1400Mw. The load management targets to reduce peak demand by one percent per year for ten years reduced the need by about another 2500Mw. Finally, assigning a value to the interconnection system will reduce the need for new generation by an indeterminate amount. For illustrative purposes, the Committee has assigned a value that reduces the need by 500 to 1000Mw.

The Provincial Treasurer cut Hydro's generation program because the Government concluded that borrowing required to support that program went beyond the prudent limits of debt creation for the Province. The Committee has concluded that the planned expansion - affordable or not - is unnecessary.

The Committee recommends that:

III-23 ONTARIO HYDRO ACCEPT THE COMMITTEE'S EARLIER RECOMMENDATIONS AND FURTHER REDUCE ITS TARGETS FOR ADDING GENERATION IN THE NEXT TEN YEARS.

Third, the Committee rejects the approach of carrying on with the system expansion program as money becomes available, keeping the new load targets as a potential reserve against future capital restrictions. Hydro's current plan puts it right at the limits of the Provincial Treasurer's borrowing directive, and beyond the Government's forecast of future capital availability. There is very little room to accommodate problems in raising funds internally, unexpected costs or unforeseen capital cost overruns. The Committee has seen the cost in dollars and management time of trying to juggle the current plan against a borrowing ceiling. Finally, the Committee believes that every advantage should be taken of opportunities to lower the rate.

The Committee recommends that:

III-24 ONTARIO HYDRO DEVELOP A NEW GENERATION PLAN THAT BRINGS ITS PLANNED GENERATION ADDITIONS DOWN TO THE COMMITTEE'S TARGET LEVELS AT THE EARLIEST, ECONOMICALLY FEASIBLE TIME.

CONSIDERING ALTERNATIVE TECHNOLOGIES

Hydro's response to the Provincial Treasurer's directive to cut its borrowing was to retain the basic framework of its program, deferring major projects for one to two years. The Committee is very concerned that Hydro consider different technologies in developing a new generation plan. The new plan should attempt to support provincial energy needs, consider alternative technologies and reconsider the "nuclear cornerstone" strategy.

The recent federal energy strategy paper appears to have accepted that Canada has, and will continue to have, an energy supply problem. The Committee is concerned that so little is being done to generate more electricity from industrial waste heat. The Committee is equally concerned that Hydro's current plans for the next 20 years contain only limited provisions for capturing some of the waste heat from its thermal generating stations for district or industrial heating.

One of the major problems in using waste heat is the organizational one of overlapping government jurisdictions. There is a clear opportunity here for leadership by the Ontario Government.

The Committee recommends that:

III-25 THE ONTARIO GOVERNMENT ACCEPT RESPONSIBILITY FOR LAUNCHING AND DIRECTING A PROGRAM THAT WILL ENSURE ONTARIO IS MAKING OPTIMAL USE OF BY-PRODUCT HEAT ENERGIES FROM THERMAL ELECTRIC GENERATING STATIONS.

The Committee explored several other possibilities with Hydro that it is convinced have not been given appropriate consideration by the utility. Small previously abandoned hydraulic sites should be reexamined to ensure that the potential is not wasted. Solar energy may be feasible as a supplementary source of heat energy, particularly in conjunction with heat-storage equipment.

The Committee recommends that:

III-26 ONTARIO HYDRO, IN DEVELOPING A NEW GENERATION PLAN, ENSURE THAT SMALL HYDRAULIC SITES ARE USED WHENEVER FEASIBLE, AND THAT THE POTENTIAL OF SOLAR ENERGY IS APPROPRIATELY TAPPED.

The Committee is concerned about Ontario Hydro's apparent failure to give serious consideration to the hydro-electric potential of the watershed flowing into James Bay.

Government leadership and action is needed. In Northern Ontario, the concerns of the native peoples and environmental problems will have to be dealt with before any development can take place. If Ontario is to gain any benefit from the Quebec Baie James potential, the Government of Ontario will have to initiate negotiations with the Government of Quebec. It is quite possible that the whole development of the James Bay watershed should be considered in the context of a national electric energy policy necessitating the involvement of the Government of Canada.

The Committee recommends that:

III-27 THE ONTARIO GOVERNMENT ACCEPT RESPONSIBILITY NOW FOR TAKING ALL NECESSARY ACTIONS TO ENSURE THAT ONTARIO RECEIVE THE MAXIMUM REASONABLE BENEFIT FROM THE HYDRO-ELECTRIC POTENTIAL OF THE JAMES BAY WATERSHED.

Finally, the Committee noted the heavy reliance on nuclear generation to meet the Province's future electric needs. Four of the next five major new stations will be CANDU nuclear stations. The Committee has several concerns. First, Hydro's massive nuclear program has never been the subject of careful public scrutiny. Second, Hydro's particular strategy in adopting nuclear energy includes a commitment to large, multi-unit plants of ever-increasing size that must be located on remote Great Lakes sites. Finally, vital questions about the economics, reliability and safety of the nuclear program remain unanswered at this time.

The Committee recommends that:

III-28 THE ONTARIO GOVERNMENT APPOINT A SELECT COMMITTEE AS THE APPROPRIATE PUBLIC FORUM TO EXAMINE HYDRO'S NUCLEAR COMMITMENT.

CHAPTER III-4

ENSURING ADEQUATE FOLLOW-UP

The Select Committee's recommendations to this point in the report set out much of the new public policy direction for Ontario Hydro. It is essential that these recommendations be seen not in isolation but as integral parts of the whole new direction. The report must be viewed in its entirety, as the new direction is a substantial redirection for both Ontario Hydro and the Government.

It is of fundamental importance that until the redirection becomes clearly established Hydro policy, steps taken by Hydro to implement the thrust of the report be monitored periodically in an organized manner.

The Committee recommends that:

III-29 (i) THE ONTARIO GOVERNMENT ACCEPT THE THRUST OF THE COMMITTEE'S REPORT AS GOVERNMENT POLICY AND INSTRUCT HYDRO TO BEGIN IMMEDIATELY TO IMPLEMENT THE COMMITTEE'S RECOMMENDATIONS. (ii) THE MINISTRY OF ENERGY COORDINATE THE GOVERNMENT POLICY AND MONITOR HYDRO'S IMPLEMENTATION ON AN ONGOING BASIS (iii) THE ONTARIO GOVERNMENT APPOINT A SELECT COMMITTEE OF THE LEGISLATURE TO WHOM HYDRO WILL REPORT ON A PERIODIC BASIS ON ITS NEW SYSTEM EXPANSION PLAN AND ITS IMPLEMENTATION OF THE COMMITTEE'S RECOMMENDATIONS COMMENCING IN THE SPRING OF 1977.

SUMMARY OF PART IV

NEW GUIDELINES FOR ELECTRIC POWER RATES

The Committee's terms of reference directed it to review Ontario Hydro's proposal to increase bulk power rates for 1976 in light of the Anti-Inflation Program of the Government of Canada, in relation to Ontario Hydro's obligation to provide power at cost, and with regard to several other factors. Among the other factors the Committee was directed to have regard for were the recovery of additional operating costs, maintennace of Hydro's financial integrity and dependence upon an adequte electric supply for Ontario's future well being. The specific reference to these related factors led the Committee to a detailed examination of Hydro's system expansion plans. The results of that examination are set out in Part III of the report immediately above. In addition, however, the terms of reference made it clear that the Committee should not examine the bulk power rate in isolation from its many impacts on the current and future economic life of the Province.

This part of the report is presented in three chapters. In the first chapter, the Committee examines the Anti-Inflation Program of the Government of Canada and its implications for the allowable bulk power rate increase. In the second, the Committee breaks down the various components of revenue and expenses and draws conclusions about Hydro's rate need in 1976. In the third chapter, the Committee anticipates Hydro's future costs, showing the impact of a reduced system expansion plan, and indicates the need for Hydro to use its full regulatory authority to control increases in the power rates that apply directly to the consumer.

CHAPTER IV-1

APPLYING THE ANTI-INFLATION PROGRAM

The Committee examined Hydro's bulk power rates in relation to the policy statement tabled in the House of Commons by the Hon. Donald S. Macdonald on October 14, 1975, the Anti-Inflation Act and Regulations, a Memorandum of Agreement between the Government of Canada and the Province of Ontario, and the Federal Government's recently released "Energy Strategy for Canada."

As the Committee's investigations were drawing to a close, a federal budget was presented that indicated some changes were being made in the Regulations. As well, the Supreme Court of Canada had just concluded a hearing questioning the constitutionality of the Anti-Inflation Act and Regulations as well as the validity of the Ontario Government's approach to giving the Federal Anti-Inflation Board power over public employees in the Province. Neither of these later developments is included in this report.

The Federal Government has taken the position that energy prices should not be controlled by the Anti-Inflation Act. The Memorandum of Agreement specifically excludes Ontario Hydro from the application of the Act and Regulations. The Committee itself has noted that the Regulations are an inappropriate mechanism for controlling the prices of a quasi-governmental Crown Corporation.

Nevertheless, the Committee's terms of reference direct it to review the proposed bulk power rates in relation to the Anti-Inflation Program. And, the Committee is aware of the potential impact of an excessive electric rate increase on individuals and the provincial economy. For this reason, although Ontario Hydro need not strictly apply the Anti-Inflation Act and Regulations to its bulk power rates, Hydro must be seen to be supportive of the intent of the Anti-Inflation Program.

The Committee recommends that:

IV-1 THE ONTARIO GOVERNMENT ENSURE THAT HYDRO'S BULK POWER RATE INCREASES COMPLY WITH THE GENERAL INTENT OF THE ANTI-INFLATION PROGRAM.

The general intent of the program is to restrain prices to a pass-through of costs with the unit profit margin remaining unchanged. The Committee found that two business categories could be applicable to Hydro: the "unit-cost" category and the "net-margin" category. Following the flow and intent of the Regulations, and applying them to Hydro's forecast costs, the Committee concluded that the Anti-Inflation Program would have allowed a price increase of approximately 31 percent for 1976.

The Committee noted with some concern that the application of the general intent of the Anti-Inflation Program did not contain the largest rate increase in the history of Ontario Hydro.

The Committee recommends that:

IV-2 THE ONTARIO GOVERNMENT ENSURE THAT THE MAXIMUM PERMISSIBLE INCREASE WITHIN THE INTENT OF THE ANTI-INFLATION PROGRAM NOT SERVE AS THE ONLY CONSTRAINT ON FUTURE BULK POWER RATE INCREASES.

CHAPTER IV-2

DETERMINING HYDRO'S REVENUE NEEDS IN 1976

The Committee's approach to Hydro bulk power rates was to determine how much revenue it needed from bulk power sales to cover the forecast of costs in 1976. With a forecast of the volume of bulk power sales, the unit rate increase required could then be calculated. In this chapter, the Committee concludes that estimates of energy variable costs are reasonable; operations, maintenance and administration costs can be reduced slightly from the forecasts, and procedures for controlling these manageable expenditures should be tightened; capital charges should be related to the overall financial integrity targets; and, the overall needs of Hydro for revenue in 1976 make it impossible to reduce the rate any further.

FORECASTING ENERGY VARIABLE COSTS

The Committee examined quite carefully Hydro's forecast of energy variable costs as well as the re-forecast made on March 31, 1976. Basically, Hydro's accounting policies ensure that on an annual basis, the forecast of costs is bound to be very close to the actual.

The Committee was concerned that water rentals, at $16 million per annum, represent a tax on the user of electrical energy that might not be an appropriate charge for the Province to make.

The Committee recommends that:

IV-3 THE ONTARIO GOVERNMENT RECONSIDER THE APPROPRIATENESS OF CHARGING ONTARIO HYDRO FOR WATER RENTALS AT HYDRO'S HYDRAULIC GENERATING STATIONS.

Another charge that concerned the Committee was the nuclear payback agreement between Hydro, the Province and Atomic Energy of Canada Limited (AECL) that arose from the construction of the first Pickering nuclear station. The Committee's concern is that the formula for compensating each party is far too generous in its treatment of the contribution of AECL and the Province.

The Committee recommends that:

IV-5 ONTARIO HYDRO CONTINUE TO RENEGOTIATE THE NUCLEAR PAYBACK AGREEMENTS TO REDUCE THE ANNUAL PAYMENTS TO ATOMIC ENERGY OF CANADA LIMITED AND THE PROVINCE.

Overall, and with the two exceptions noted, the Committee accepted Hydro's forecast of energy variable costs.

TIGHTENING UP ON OPERATIONS, MAINTENANCE AND ADMINISTRATION

Operations, maintenance and administration (OM&A) costs encompass the tremendous variety of costs in operating a huge electric power utility. The Committee was very concerned about the size and growth of OM&A expenses. The 1976 budget of $376 million is about $70 million or nearly 22 percent higher than the 1975 budget. With increases over the next several years forecast to average better than 11 percent annually, OM&A expenditures will be in the order of half a billion dollars by 1980.

In its examination of whether the 1976 OM&A costs appeared to be generally in line with the work requirements of operating, maintaining and administering Hydro's sizeable plant, the Committee found that: the increases appeared generally to be justified; their overall level seemed under control; and the specific questions raised by the Committee were adequately dealt with.

After reviewing these findings, the Committee concluded that OM&A costs are generally controlled, and that there is no justification for across-the-board cuts. Reductions will only come from the hard, continuous management task of seeking small improvements and minimizing cost increases. In this light, the Committee was concerned that Hydro had allowed the budgets to drift up some $8 million beyond the target level proposed to the Committee in January, and against which the Committee was assessing the possibilities for further reductions. The effect of this upward drift is to more than offset the $2 million savings identififed by the Committee (closing J. C. Keith and cutting back the forestry program), and the $3 million savings from deferring the start-up of the Bruce A generating plant.

The Committee recommends that:

IV-5 ONTARIO HYDRO HOLD ITS OM&A BUDGETS TO THE TARGET LEVEL PROPOSED TO THE COMMITTEE IN FEBRUARY REDUCED BY THE DEFERRED START-UP OF BRUCE GENERATING PLANT, THE CLOSURE OF J.C. KEITH PLANT AND THE CUTBACK IN THE FORESTRY PROGRAM.

The second area of the Committee's investigation of OM&A was the budget process. The conclusions reached in examining costs generally make it imperative that Hydro's budgetary planning and control processes be the best possible. The Committee was concerned to find that Hydro's budget process was seriously deficient.

The budgeting processes do not appear to be sufficiently responsive to Hydro's fast-changing financial environment. The procedures appear to be too cumbersome to allow Hydro to accommodate a request for cutbacks in a timely way. The budgets do not highlight performance. The Committee seriously doubted whether the budgets were effectively supporting Hydro's commitment toward improving costs. Finally, and probably of greatest importance, significant improvements are needed in Hydro's capital budgeting process. Without clear policies towards capital expenditures, the Committee doubted that the Corporate Office could allocate capital to its most effective uses among the branches' competing demands.

Thus, while the Committee has not concluded that a dramatic slashing of the OM&A budgets is warranted, it does have several important recommendations.

The Committee recommends that:

IV-6 ONTARIO HYDRO REDUCE THE HIGH LEVEL AND RATE OF GROWTH PREDICTED IN OM&A BUDGETS BY PUTTING NEW EFFORT INTO IMPROVING PRODUCTIVITY, CUTTING COSTS, AND INCREASING THE EFFICIENT USE OF ITS PLANT.

IV-7 ONTARIO HYDRO MODIFY ITS BUDGET PROCESS TO HIGHLIGHT PERFORMANCE AND TO MAKE THE TIMING OF THE PROCESS MORE RESPONSIVE TO THE CURRENT FINANCIAL ENVIRONMENT.

IV-8 ONTARIO HYDRO ESTABLISH CLEAR GUIDELINES FOR CAPITAL EXPENDITURES, AND PROCEDURES TO ENSURE THE EFFECTIVE CONTROL OF THE RATIONING OF CAPITAL TO PROJECTS.

SETTING TARGETS FOR CAPITAL CHARGES

There are four components to the capital charges the Committee has examined. These are interest, depreciation, debt retirement and system expansion.

The entire issue of Hydro's capital charges is an extremely complex one. It involves an accounting charge for depreciation, a formula charge for interest, a statutory appropriation for debt retirement and a non-statutory appropriation to ensure financial soundness. It is difficult to assess how the concept of "power at cost" can realistically be applied to this mix of charges and appropriations.

Additionally, the examination of capital charges brought the Committee into the area of Hydro's financial integrity and overall provincial financing. The Committee was told that reducing the amount of funds available for capital charges and appropriations would impair Hydro's financial integrity and would increase its needs at a time when capital availability is limited.

"Financial integrity" in turn will affect the amount of money the financial communities are prepared to lend to a borrower and the interest rate associated therewith. The lower the financial integrity, generally speaking, the less capital will be available to a borrower and the higher the cost of funds. While market reaction to eroding financial integrity may be gradual in the form of slowly rising relative cost on money, it may also be more dramatic in the form of a derating. In this later case, capital availability and cost of funds may be substantially altered overnight.

The Select Committee was able to draw one firm conclusion. The primary objective of the capital charges should be to maintain the financial condition of Hydro so that it does not contribute to a deterioration in the credit rating of the Province. The Committee's approach - given this conclusion - was to work out a measure of overall capital adequacy and set a standard for 1976. The measure used by the Committee was the cash flow coverage of actual interest (about $585 million); the measure, a ratio of 1.06 times. Based on that measure, Hydro's overall need for internally generated capital is about $620 million. Based on Hydro's standards, the overall need for capital is about $617 million.

ESTABLISHING HYDRO'S NEED FOR BULK POWER REVENUE

	Revenue Needs for 1976 $ Million	
	Hydro's Capital Criteria	Committee's Capital Criteria
Energy Costs	488	488
OM&A (including municipal tax)	386	386
Capital	617	620
Revenue Needs	$1,491	$1,494

The table above sets out the range of Hydro's revenue needs in 1976. The energy costs are a repetition of Hydro's forecast for 1976. The OM&A cost is based on Committee recommendation IV-5 that Hydro not let its budgets slip beyond the target levels proposed to the Committee, while taking advantage of identified savings. The estimates of capital are set out above.

Thus Hydro appears to need about $1.5 billion in bulk power revenue. Of this amount, Hydro estimates that about $112 billion will be recovered from secondary sales. About another $115 billion will be recovered from Hydro's retail sales, leaving a need for bulk power revenue of about

$1,260,000,000. Hydro's latest forecast, however, is that bulk power revenues will be less than this amount. In fact, it is currently forecasting bulk power sales of only about $1.2 billion. Thus, Hydro's revenues will fall about $60 million short of the demonstrated need. In this context, the Committee cannot justify a further decrease in the bulk power rate.

The Committee recommends that:

IV-9 ONTARIO HYDRO CONFIRM FOR THE BALANCE OF 1976 THE BULK POWER RATE INCREASE OF 22 PERCENT RECOMMENDED IN THE COMMITTEE'S INTERIM REPORT.

CHAPTER IV-3

PUTTING HYDRO'S REVENUE NEEDS IN PERSPECTIVE

Although Hydro's 1976 rate increase is very high, the Committee recognized with some satisfaction that its rate recommendation will have saved the electricity consumers of Ontario some $40 million this year from what they might have paid under the rate levels recommended by the Ontario Energy Board. In this concluding chapter of its report, the Committee will provide a longer term perspective on Hydro's need for increasing revenue, and consider the impact of one possible way of reducing the system expansion plan. In addition, the Committee will consider the impact of increases in bulk power rates on the consumer, suggesting that the impacts be mitigated to the maximum extent possible.

Hydro provided the Committee with a general estimate of foreseeable cost increases for the next ten years. While the figures provided are not intended as official Hydro forecasts, they do indicate the general pattern of rate increases required to keep pace with Hydro's probable cost levels.

Hydro is expecting a very high cost increase in 1977, followed by moderating increases that, by 1980, are consistently below 10 percent. As the Committee received this information just as the hearings were drawing to a close, it did not have the opportunity to examine all of the underlying assumptions, or to consider all of its implications. It did, however, identify the two factors that appear to produce the forecast pattern of cost increases. They are the need to establish a new cost plateau consistent with Hydro's current and longer term development as a thermal-generation-dominated utility, and the need for "catch-up" to reestablish Hydro's financial condition after two years of low or negative income.

The Committee, in recommending that Hydro reduce its system expansion plans by managing demand and reducing reliability levels before adding new generation, was aware that the size and shape of the system expansion program ultimately determined the need for revenues. To illustrate the effect of a reduced system expansion plan, Hydro was asked to estimate the cost of power for the period to 1987, using the same assumptions as above, with one plant - generating station B at Bruce - eliminated. There are three significant results of that analysis. First, the forecast savings in the early years are minimal. The long lead time involved in building generating stations means that the first planned addition that can reasonably be cancelled is only just starting to be built. Second, even after the first years, the basic pattern of cost increases in unchanged. Hydro is such an enormous corporation that even the cancellation of a $3 billion plant has little effect. Finally, the dollar saving from cancelling a plant is substantial. To 1987, electric power users could save more than $750 billion.

EASING THE BURDEN ON THE CONSUMER

The bulk power rate is applied only to the relatively few direct industrial customers and to the municipal utilities. Most consumers of electric power buy from municipal utilities at prices that are set by, and unique to, each utility. Under the Memorandum of Agreement signed by Ontario and Canada, jurisdiction for the direct application of the Anti-Inflation Act and Regulations to the municipal utilities was assigned to Ontario Hydro.

The Committee has, from its beginning, been deeply concerned about the impact of Hydro's bulk power rate increases on the consumer. In its interim report, the Committee "specifically hoped that the 1976 rate increase could be kept to a level that could be related to the increase in incomes allowable under the guidelines. The Committee therefore carefully considered the impact an increase in the bulk power rate would have on the typical residential customer." The Committee expects that Hydro will use its regulatory powers to contain municipal rate increases in much the same way as the Committee has approached Hydro's bulk power rate increase: applying the general intent of the guidelines; examining each component of cost; and, looking at the rates in a longer-term perspective.

The Committee recommends that:

IV-10 ONTARIO HYDRO EXERCISE ITS FULL REGULATORY AUTHORITY TO MINIMIZE THE IMPOSITION OF LARGE ANNUAL RATE INCREASES AT THE LOCAL LEVEL.

Growing Public Involvement with Ontario Hydro

Growing Public Involvement with Ontario Hydro

PART II

GROWING PUBLIC INVOLVEMENT WITH ONTARIO HYDRO

When this Select Committee first met in October 1975 to consider Ontario Hydro's proposed bulk power rate increase, the public already had substantial input into the corporation's decision making. Hydro had just completed its second public hearing before the Ontario Energy Board on its rate increases. It was just beginning to become extensively involved in public hearings before the Royal Commission on Electric Power Planning. Its generation sites and transmission lines were subject to public hearings. And, it was working on a new rate design in preparation for a new public hearing before the Ontario Energy Board later in 1976. Ontario Hydro could well argue that it was a corporation whose decisions were examined closely and influenced by the public.

This appearance of extensive public participation seems even more pronounced when it is considered that Hydro is a public corporation owned not privately but by the citizens of Ontario. It was conceived through intensive public concern. It reports to the Legislative Assembly of Ontario through the Minister of Energy. It operates under the aegis of a board of directors appointed by the Lieutenant Governor in Council from the public. Ontario Hydro is intended to be an organization that is closely tuned with and highly responsive to public direction.

Despite Hydro's extensive contact with the public, the Legislative Assembly determined that, before a new rate increase could be applied, Ontario Hydro had to be examined in another public forum - that of a Select Committee of the Legislature. Further, the Select Committee concluded after its first five weeks of hearings that it could recommend only an interim rate increase because other important areas of Hydro's plans and operations needed careful public scrutiny by the Legislature and explicit legislative direction. In this part of the report the Committee will trace Hydro's development as a public corporation, the recent explosion of public involvement in its decision making and the particular need for, and the investigative process of, the Select Committee.

GROWING AS A PUBLIC INSTITUTION

Ontario Hydro is a special statutory corporation created under the name of the Hydro-Electric Power Commission of Ontario in 1906 by an act of the Ontario Legislature that dealt with the supply of electric power to the municipalities. The passage of the act was the culmination of a series of events stretching over several decades that had made public power an important issue in the provincial election campaign in 1905. From that beginning, Hydro has grown to be one of the world's largest electric utilities.

Establishing the Public Commission

The transmission of electric energy over relatively long distances became practicable in the 1890s with the development of alternating current. In November of 1896, this new technology permitted power from a generating station at Niagara Falls, New York, to flow to the City of Buffalo. The Niagara Falls plant was the first major hydro-electric station built. It focussed attention on the advantages of hydraulically powered generators over coal-fired systems for a province, like Ontario, that had abundant water resources but was lacking in coal deposits. (These advantages were accentuated in 1902 when coal miners in Pennsylvania went on strike and $3.50-a-ton Pennsylvania coal had to be replaced by coal imported from Wales at $10-a-ton.) In 1900, a committee appointed by the Toronto Board of Trade had reported that the Niagara River was the most economical source of power for Toronto, and raised the question of whether or not the City of Toronto should own and operate the necessary transmission lines from the Niagara River. While the Provincial Government granted rights to private interests to build generating stations on the Canadian side of the Niagara River, it refused permission to the City of Toronto on four separate occasions to establish a municipally owned public utility to supply the city with electric power from Niagara Falls. However, in turning down Toronto's fourth application in 1902, the Government promised to introduce legislation that would allow groups of municipalities to develop electric power in cooperation with one another.

On June 9, 1902, a meeting of manufacturers and municipal leaders, organized by E.W.B. Snider and B.D. Detweiler, took place in Berlin (Kitchener) to discuss ways of obtaining an ample supply of low-cost electricity for industries in Toronto and Waterloo County. The keynote speaker was Alderman Frank Spence of Toronto, an advocate of public ownership of electric power. A subsequent meeting in February 1903 was attended by Adam Beck, M.P.P. and Mayor of London, who, from that date until his death, was a major force in the creation and development of Ontario Hydro. Representations made to the Government, following the latter meeting, resulted in the passage of a bill giving municipalities the right to transmit power from the Niagara River. The bill did not envisage any financial responsibility on the part of the Provincial Government, but it did provide for the setting up of the first of several commissions concerned with the development of hydro-electric power in the Province.

Five months after the change of Government in 1905, the Hydro-Electric Power Commission of Enquiry was established under the guidance of Adam Beck. The Commission was directed to survey the undeveloped water resources of Ontario and to estimate future demand and rates along with the capital costs of generation facilities and transmission lines. Shortly after the Commission's report, and less than a month after a march on Queen's Park by 1,500 delegates representing 70 municipalities calling for government operation of provincial water power resources, Adam Beck introduced a bill in the Legislature entitled "An Act to Provide for the Transmission of Electric Power to the Municipalities." The bill provided for the formation of the Hydro-Electric Power Commission of Ontario and dealt with the supply of electric power to the municipalities. On May 14, 1906 it was given Royal assent, and on June 7 the first Commission was formed, with Adam Beck its appointed Chairman.

Building the System

In 1907, the Act was repealed and reenacted under the name of the Power Commission Act, essentially establishing the Commission as a wholesaler, and the municipalities as retailers, of electric power. Since that time, the Commission has grown extensively, changing from a totally hydraulic system to one relying increasingly on thermal generation. In addition, the Hydro system has become electrically interconnected with virtually every other system in North America. Today, Ontario Hydro is the largest electric utility in Canada and one of the largest in the world. It has served and facilitated the rapid economic growth of the Province of Ontario and contributed to the well being of its residents by providing electricity at relatively low rates. At the same time it has achieved a reputation in the utility industry as an innovative and efficient leader.

Immediately following its establishment, the Commission began a program of purchase and development of generating facilities. The climax of this first developmental phase was the opening of the Queenston-Chippawa development (Sir Adam Beck - Niagara Generating Station No. 1) early in 1922. By the end of 1922, the Commission's generating capacity totalled 496,000 kilowatts to meet a demand of 460,700 kilowatts.* While extension and expansion of the system continued, its greatest period of expansion awaited the end of the Second World War. Since 1945 Ontario Hydro has increased its generating capacity about ten times to 20,000,000 kilowatts. As of December 1975, the Hydro system comprised approximately 23,500 circuit miles of transmission and circuit lines and 55,000 miles of primary lines for rural distribution. The value of its fixed assets at cost, including those under construction, less accumulated depreciation, was more than $7.6 billion.

Hydro's basic generating technology has changed from an exclusive reliance on hydraulic power to an increasing dependence on thermal power. In 1951, in a departure from the long-standing pattern of hydro-electric development, Hydro brought its first two coal-fired generating stations into service. While the next two significant construction projects were major hydro-electric developments, the completion in 1958 of the second, the R.H. Saunders - St. Lawrence Generating Station, tapped the last major source of hydro-electric power in Southern Ontario. By 1975, approximately 66 percent of Hydro's generating capacity was fueled by coal, oil, gas and uranium. By 1985, thermal-electric installations, both fossil fuel and nuclear, will represent more than 80 percent of Hydro's generating capacity (Exhibit 1).

Hydro's present plan is to fuel most of the future growth and development of its generating system by nuclear power. The Commission is committed to a multi-billion dollar nuclear expansion program. In 1959,

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* - A watt is the basic unit of electric power, expressing the rate at which electric energy is expended. A kilowatt is 1,000 watts and is abbreviated as kw. A megawatt is 1,000 kilowatts, and is abbreviated as Mw.

A kilowatt hour is the basic unit of electric energy equal to one kilowatt supplied steadily for one hour. It is abbreviated as kwh.

Hydro and Atomic Energy of Canada Limited (AECL) collaborated in the construction of the Douglas Point Nuclear Power Station, which produced initial power in January 1967. Since that time, nuclear power has become the cornerstone of electric generation planning in Ontario. Essentially, this commitment sprang from a conviction on the part of Ontario Hydro that nuclear generation plans offer strategic advantages for Ontario - principally in an assured fuel supply. Because nuclear plants can be fueled with Ontario uranium, they reduce Hydro's and the Province's dependence on imported fossil fuels. As well, uranium prices are projected to be more stable than those of conventional fuels and, although the capital costs of constructing a nuclear plant are high, they are projected to have comparatively low overall operating costs. Hydro expects to add two stations at Bruce, a second station at Pickering and the first units of a new station at Darlington to its current nuclear capacity by 1985, accounting for most of its generation growth in the decade ending with that year.

The system is essentially province-wide, although for operational purposes it is divided into an East System and a West System. The dividing line between the two is slightly to the west of Wawa, on the northeastern shore of Lake Superior. The capacity and load of the West system constitutes only about 4 percent of the total system. These two systems are interconnected by means of a 385-mile, 230-kilovolt line.

Through interconnections with utilities in other jurisdictions, Ontario Hydro is effectively part of an interconnected power system extending over most of North America. The East System is interconnected with electric utilities in New York and Michigan, and the West System with Manitoba Hydro. In addition, Hydro is a member of the Northeast Power Coordinating Council comprising utilities in Michigan, New York, New England and New Brunswick, part of an interconnected power system extending over most of the continental United States. As a result of technical constraints, Hydro is not interconnected with Quebec in the same way that it is with the rest of the North American power grid. However, by electrically isolating the specific plants involved in a transfer, Ontario Hydro and Hydro-Quebec do effect extensive power and energy exchanges.

In the future, Hydro could expand into energy-related fields beyond the generation and distribution of electricity. For example, a recent study of the feasibility of district heating for the planned new community of North Pickering suggests that Ontario Hydro may become involved in this energy-efficient method of providing heat. Current developments in the utilization of solar energy could lead to Ontario Hydro's involvement as a supplier of solar-powered supplementary heating units. As conventional sources of energy become scarce or prohibitively expensive, Ontario Hydro may have a vital and much broader role to play in protecting Ontario's energy future.

RESPONDING TO INCREASED PUBLIC PARTICIPATION

The extent of Hydro's economic activity and growth has a continuing, far-reaching and expanding impact on the Province. For many years, Hydro has maintained a working relationship with the Provincial Government. The Power Commission Act spelled out the statutory relationship. For example, it gave the Provincial Treasurer the specific responsibility for approving financial advances to Hydro by the Province. Hydro was to present an annual report to the Provincial Secretary, and the Lieutenant Governor in Council was given wide and overriding powers. The most important aspect was, however, the working relationship between the Provincial Premier, the Minister responsible for Hydro and the Chairman of the Commission. This arrangement has changed considerably in the 1970s. The public is now involved in the Hydro planning process, rates are reviewed in a public forum, and the financial requirements set by the Provincial Treasurer are an important constraint on Hydro's development.

Involving the Public In Planning

Prior to 1971, Hydro's planning process involved the Government and the public only to the extent that Hydro reviewed its plans for its projects with a "liaison committee" consisting of representatives of several ministries. Hydro consulted appropriate authorities and spoke to local municipalities to determine whether a proposed project interfered with any planned development. The public itself was not involved directly. For example, it was not customary for Hydro to hold public meetings or to publish information until it had designated a site or route.

As the Hydro system continued to grow, the need for firm policy direction from Government to Hydro and increased public participation in Hydro's affairs has become more pronounced. Public demand for a voice in the planning process first became significant in 1971, when public groups were able to stop construction of the Toronto central switching station on the site Hydro had chosen. The next year, 5,000 signatures were gathered for a petition asking the Provincial Premier for a further study and a public inquiry into the routing of the proposed 500-kilovolt transmission line from Nanticoke to Pickering. This request led to the creation of the Solandt Commission by Order-in-Council in June 1972 under the Public Inquiries Act. By a subsequent Order-in-Council in October 1973, the Commission's terms of reference were expanded to include a review of the proposed 500-kilovolt transmission route between the Lennox Generating Station and Oshawa. Dr. Solandt submitted separate reports to the Government in March 1974 and April 1975. The ultimate Cabinet decision that, in essence, supported Dr. Solandt's recommendation on both routes affirmed the public's role in planning transmission lines.

In recognition of the growing interest of the public in Ontario Hydro, the speech from the Throne delivered on March 30, 1971 included the following statement:

> "The Government is determined to assure the adequacy of our energy supplies for the future. It will ensure that the energy is used as efficiently as possible and that its use will not adversely affect the environment, health or life. The Government will strive to maintain a choice between the various types of energy to match them with those uses for which they are best suited. To this end, the Committee on Government Productivity has been asked to review the function, structure, operation, financing and objectives of the Hydro-Electric Power Commission of Ontario."

The Committee on Government Productivity delegated the responsibility to a semi-autonomous body, Task Force Hydro, which reported to Government through the Committee. In its terms of reference, Task Force Hydro was asked:

> "To recommend realistic, practical and innovative ways in which the operations of Ontario Hydro can be made more efficient, more effective and more responsive to the changing requirements of the Province of Ontario."

In Report Number One (August 1972), Task Force Hydro recommended that Ontario Hydro be responsible to the Provincial Government for the generation, distribution and transmission of electric energy, and that it discharge its responsibilities in compliance with overall Government policy, after receiving the broad policy direction within which it must operate.

The Task Force recommended further that, to give expression to Government policy and to define Hydro's mandate, a contract be drawn up between Hydro and the Provincial Government.

In December 1972, the Advisory Committee on Energy (ACE) reported that "energy policy will be of major significance to the Government of Ontario in the coming decades" and recommended the development of a comprehensive and coordinated energy policy as a matter of high priority, and the establishment of a separate ministry for energy, to whom Ontario Hydro would report.

Task Force Hydro recognized the growing importance of public participation. In Report Number One it recommended that Hydro consider the establishment of ad hoc citizens' task forces to provide for public participation in the locating of generating and transmission facilities and in other matters of concern to the public.

Certain activities of Ontario Hydro have, then, been very closely monitored by the public in recent years, and its participation is becoming an accepted input into the Hydro planning process. The Government has recently set up a Royal Commission to work out how the planning process should proceed. On July 11, 1974, the then Minister of Energy, the Hon. W.D. McKeough, announced that there would be a public inquiry into the long-range planning concepts for electricity supply in Ontario. In March 1975, the then Provincial Secretary for Resources Development, the Hon. Allan Grossman, announced the establishment, under The Public Inquiries Act, of a Commission to be headed by Dr. Arthur Porter to inquire into the planning of Ontario's electrical power needs for the period 1983 to 1993. A subsequent Order-in-Council in July 1975 expanded the membership of the Commission to five and set forth the terms of reference for the inquiry (Exhibit 2). Information hearings are currently being conducted by the Commission, which released its first progress report in May 1976. The main inquiry is expected to begin in late 1976, with hearings to extend over about four months. The Commission is expected to make its recommendations to the Provincial Secretary for Resources Development by the end of 1977.

A small pilot study conducted by the Commission indicated that 82 of 100 respondents believed that the Government should become more involved in planning energy requirements, and many that the Ontario Government should directly control the supply of energy and how it is to be used.

Meeting the Demand for Public Rate Setting

In Report Number Four, Task Force Hydro recommended that an Electricity Rate Review Board be appointed to review publicly proposals for changes in wholesale and direct individual rates and the principles underlying the establishment of retail rates across the Province. The primary purpose of the Board would be to provide "an objective public review and independent opinion on Electricity rate matters . . . a public forum where Hydro's applications for power rate increases could be debated and interventions be made by Hydro customers and the public at large."

Earlier, the Advisory Committee on Energy had recommended the establishment of an Ontario Energy Commission whose responsibilities would include:

> "To review, from the standpoint of broad policy the proposals of Ontario Hydro regarding: (i) changes in electric power rates; (ii) long range plans; (iii) programs and capital requirements for new electric power facilities; and (iv) plans for sources of primary energy including nuclear power."

From the recommendations of ACE and Task Force Hydro a broad consensus emerged that culminated in a 1973 amendment to the Ontario Energy Board Act. The amendment required Ontario Hydro to submit any proposed changes in its rates to the Minister not less than eight months before the date that the change is proposed to come into effect. The Minister then refers the proposal to the Ontario Energy Board (OEB), which holds public hearings, reporting to the Minister at least four months before the effective date of the proposed change. Because Hydro is a public corporation, the OEB's function is to "review" Hydro's rate proposal and any other matter referred to it by the Minister. The OEB does not set the rate. That prerogative is retained by the Board of Ontario Hydro.

Hydro's rates have now been reviewed twice by the OEB. In April 1974, Ontario Hydro submitted a proposed rate increase averaging 15.3 percent to municipal utilities and 16 percent to direct industrial customers, to become effective January 1, 1975. After 41 days of hearings the Energy Board recommended, through a series of proposals, rate increases of 12.7 percent to municipal utilities and 14.5 percent to direct industrial customers. By implementing some of the Board's proposals and rejecting others, Hydro approved rate increases of 12.4 percent and 15.2 percent respectively.

In April 1975 Hydro proposed a rate increase averaging 29.7 percent to municipal utilities and 30.5 percent to direct industrial customers to become effective January 1, 1976. An important element in its new rate submission was a change in financial policy, approved by the OEB, that allowed Hydro to recover deficits over five years and average revenue requirements over three years, to minimize rate fluctuations. The effect of this change was to reduce the proposed rate increase from about 38 percent to the 29.7 percent request. Following the submission, new data and circumstances suggested that Hydro revise its proposal. A lower load forecast, significant reduction in secondary sales of interruptible power, revised forecasts of interest and cost escalations all contributed to a need to revise the original proposal slightly upward. Hydro decided, however, not to change the original proposal. Shortly thereafter, the Government included in its July mini-budget directives to Hydro to moderate its requirements. By cutting administrative costs, deferring the collection of deficits and cutting in half the system expansion charge for 1976, Hydro reduced its 1976 proposal to 25 percent for municipal utilities and 25.2 percent for direct industrial customers.

After 55 days of hearings, the OEB recommended, through a series of proposals, somewhat higher rate increases of 26.6 percent to municipal utilities and 26.7 percent to direct industrial customers. The Hydro Board eventually approved rate increases of 25 percent and 25.2 percent respectively, in accordance with its earlier commitment to the Provincial Government and in light of the newly announced Anti-Inflation Program, although it noted the adverse financial impact the lower rates would have on the corporation.

While the rate review mechanism is a relatively recent innovation in Ontario, the diligence of the Ontario Energy Board, the cooperation of Hydro and the active interest of the various intervenors have helped to establish firmly the principle of public participation in the rate-setting process.

Working Within Borrowing Limits

Hydro's long-term debt is guaranteed by the Province of Ontario in its Canadian and non-American international borrowings. In the United States, the Province borrows directly, and relends the funds to Hydro under identical terms and conditions. Whether guaranteed or borrowed in the name of the Province, Hydro's debt and the provincial debt are seen by investors to be very close substitutes.

There has always been a close relationship between Hydro and the Provincial Treasurer on the timing, size and placement of long-term debt issues. As the Province itself has made relatively few demands on the capital markets, coordination of the placement of Hydro borrowing under the direction of the Provincial Treasurer was aimed primarily at ensuring the stability of capital markets. With the provincial economy strong, and provincial borrowings limited, Ontario Hydro has benefited from the top credit rating of the Province.

Since 1975, the relationship between Ontario Hydro and the public financing of the Province has changed substantially. In that year, the combined borrowings of Ontario and Hydro increased by 400 percent. For the first time, Hydro experienced problems in marketing new issues. The Province's high credit rating came under review by at least one of the major U.S. rating agencies. There were at least two important consequences of the new concern about the ability of the Province and Hydro to finance their requirements.

§ The Provincial Treasurer has become more closely interested in Hydro's financial condition. In November of last year, the Hon. W.D. McKeough appeared before the Select Committee to suggest that Hydro's overall financial condition be explicitly considered by the Committee in its rate recommendations. The Provincial Treasurer in January 1976 set limits on Hydro's annual public borrowings to 1982, in the most dramatic and important change in the relationship between Hydro and the Government in many years. These limits forced Hydro to reassess its capital construction program, resulting in a $5.2 billion reduction in its expansion plans over the next decade.

It is the view of the Ministry of Treasury, Economics and Intergovernmental Affairs (TEIA) that the Province is now living in an era of continuous borrowing restraint. The Ministry has projected prudent limits to the amount of public borrowing that can be anticipated to be available in the Canadian, American and other international markets for the next several years. Its projections show that by 1980, it is likely that Hydro will not be able to borrow the amounts needed to finance its reduced system expansion program (Exhibit 3).

INVOLVING THE ONTARIO LEGISLATURE

Ontario Hydro was conceived in a ferment of public activity. It has grown as a public corporation. In the 1970s, it has responded to a public demand for more participation in its developmental planning. Its rate setting is now publicly reviewed. Its expansion program has been limited by constraints on the expansion of public debt. Still, the Legislative Assembly saw the need to establish a Select Committee to investigate Hydro's proposed bulk power rates for 1976. (Appendix A sets out the terms of reference of the Committee.) And, that Committee found it necessary to undertake a fundamental reexamination of Hydro's expansion planning and to set a new public policy direction for Hydro. In this section, the Committee will first, set out the reasons that in its view led to both the formation and eventual conclusions of the Committee and second, set out a brief chronology of its hearings.

Bringing Public Direction Into Focus

In many respects, this Committee was a natural outgrowth of increasing public participation and an increasing awareness of the urgent need for firm Government policy direction for Ontario Hydro. Hydro's growth and direction have a tremendous impact on virtually every citizen of the Province. Its generation and transmission plans have raised environmental and land use issues of a new order of magnitude. Its current need for large rate increases affects virtually everyone in the Province, directly as users and indirectly as employees or suppliers of Ontario's industrial base. Its needs for financing now affect the capital markets and the Province's ability to borrow for other Government programs.

It is apparent that Ontario Hydro has entered a new era. The Committee found, however, that while the public - directly and through its Government - was involved in many aspects of Ontario Hydro, there was no focus to the involvement. There was no single forum or combination of forums that looked at the overall direction of Hydro's expansion program and its need for revenue from a public policy perspective.

§ Task Force Hydro looked at Hydro's role and place but, rather than making specific recommendations in some areas of public policy, it recommended that the Government and Hydro agree on a specific contract that sets out Hydro's mandate.

§ The Ontario Energy Board comments on Hydro's system expansion if so directed by the Minister, but it believes that issues of overall socioeconomic policy are not within its terms of reference.

§ The Royal Commission on Electric Power Planning is examining Hydro's plans, but its focus is more on the process of planning than the particular elements of the plan and on the longer term (after 1983) than on what appear to be the critical years ahead.

§ The Provincial Treasurer has dramatically altered Hydro's system expansion, but his intervention, directed to the prudent limits of Provincial debt expansion, has helped to define the new planning environment, rather than providing an appropriate response to it.

Therefore the Select Committee found an urgent need not only to examine Hydro's proposed bulk power rates (which it does in Part IV of this report) but, as well, to set new objectives for Hydro's planning (which it does in Part III). The Committee has concluded that it will be necessary for the Government to provide firm policy directions to Ontario Hydro on an ongoing basis. Clear ongoing policy direction has not been given to Ontario Hydro in the past. Within the structure of the Ontario Government, Ontario Hydro is currently assigned the responsibility as a delivery agency within the ambit of the new Ministry of Energy through which it is expected to receive policy direction.

The Committee recommends that:

II-1 THE ONTARIO GOVERNMENT DEVELOP AND CLEARLY ARTICULATE GOVERNMENT POLICY TOWARDS ONTARIO HYDRO.

Working as a Select Committee

The Select Committee operated in two sessions. The first session began in late October 1975 and finished on December 12, 1975 with an interim report and recommendation (Appendix B). The second session began in January of 1976 and concluded in June with this report and recommendations.

Overall, the Committee held almost 100 meetings, accumulated nearly 150 exhibits, and heard from more than 100 witnesses, including the senior management of Hydro, representatives of the Provincial Government, the municipal utilities, the financial community, industry and many independent experts. Appendix C is a summary of the Committee's schedule. Appendix D lists the witnesses that appeared before it.

During its first five-week session, the Committee met almost daily. Individuals and organizations responded to an advertisement by writing to the Committee expressing their views on the proposal. Each submission received was acknowledged and entered in the record, with copies being made and circulated to each member of the Committee and its staff. In addition, the Committee heard from a great number of witnesses in this very short period. The witnesses fell broadly into two categories. On the one hand, the Committee heard from and questioned representatives of the Government, organizations and individuals who provided outside perspectives on Hydro and its place in the Ontario economy. On the other, the Committee requested and questioned evidence presented by Ontario Hydro on the specific areas of Hydro's operations that impact most directly and significantly on Hydro's bulk power rates.

In its interim report, the Committee concluded that a responsible interim rate reduction, taking into account the right balance between the fight against inflation and the short-term financial integrity of Hydro and the Province, was justified on a broad policy basis. The Committee was, however, unable to make any determination of the appropriateness of Hydro's system expansion plans although it was concerned about the need for and direction of the massive expansion program of Ontario Hydro. It found it necessary to probe more deeply the fundamental and unanswered policy questions concerning future demand, reserve policies and generation mix in order that all members of the Legislature and the people of Ontario be provided with the opportunity of understanding more fully the impact of Hydro policies and alternative approaches in the broad socioeconomic context.

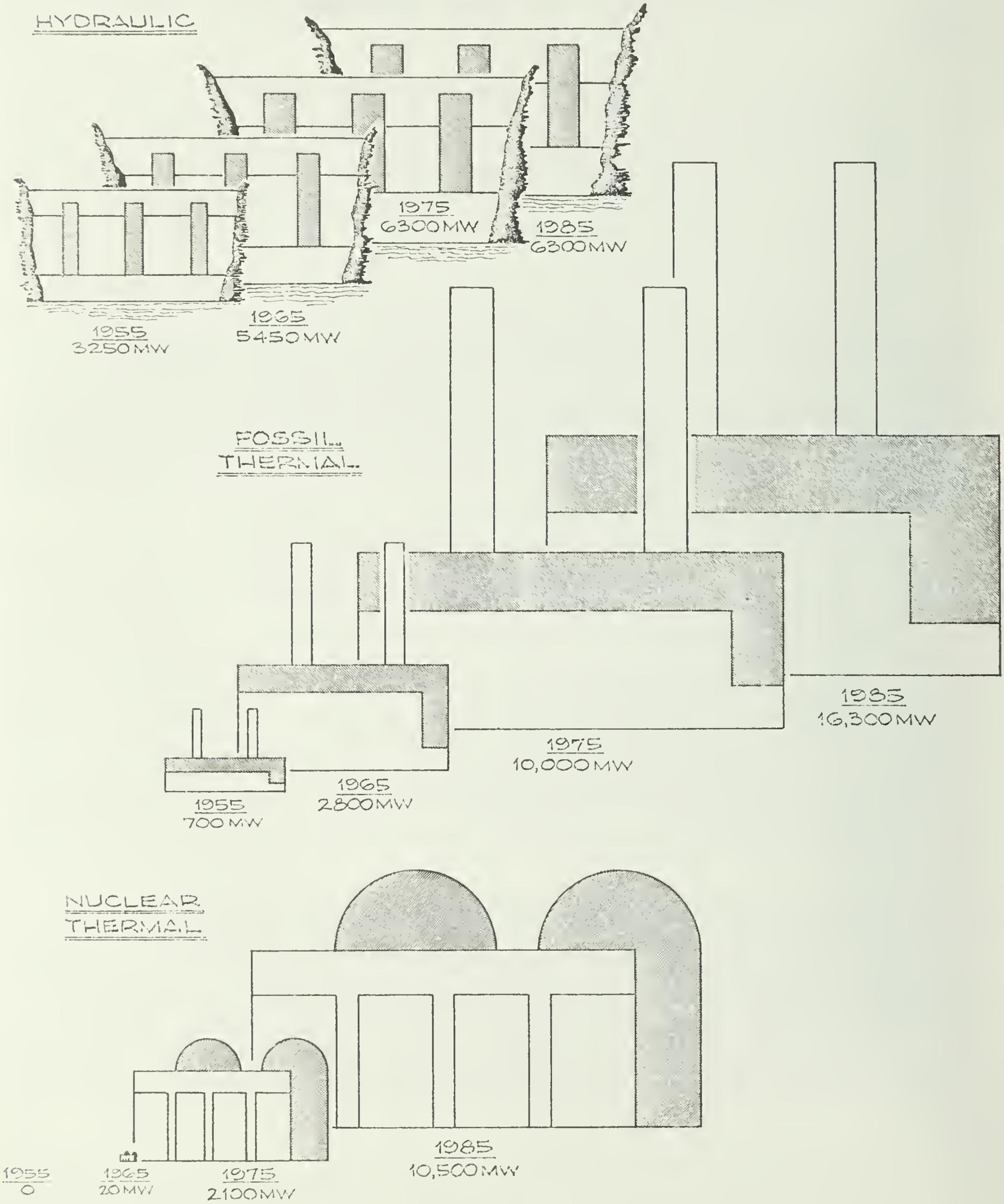
In its second session, the Committee met several days a week from January through May to consider the fundamental questions that it had outlined in its first session. Ontario Hydro pulled together and presented to the Committee a vast amount of information on the planning and operation of an electric utility. Experts from throughout North America presented oral and/or written testimony on the critical areas requiring Committee decisions. In drawing conclusions and making the recommendations in this report, the Committee relied heavily on the testimony of Hydro and the other expert witnesses. The balance of this report contains the important conclusions of the Committee resulting from this difficult undertaking. Appendix E lists the recommendations in the order in which they appear in the report. Appendix F lists separately the recommendations that apply to the Ontario Government and to Ontario Hydro.

From time to time during the course of the hearings of the Committee, Mr. Julian Reed (Halton-Burlington) and Mr. John Lane (Algoma-Manitoulin) spoke about the continuing concern of some citizens about the Bradley-Georgetown and North Shore Hydro Corridors. As this was not a matter central to the terms of reference of the Committee, the Committee deliberately refrained from hearing any evidence and making any recommendation, about either Corridor.

Exhibit II-1

ONTARIO HYDRO'S SYSTEM HAS GROWN AND CHANGED OVER 30 YEARS

INSTALLED & DEPENDABLE CAPACITY



SOURCE - ONTARIO HYDRO

Exhibit II-2

TERMS OF REFERENCE FOR

THE ROYAL COMMISSION ON ELECTRIC POWER PLANNING

The Royal Commission on Electric Power Planning, has been empowered and instructed to:

1) Examine the long-range electric power planning concepts of Ontario Hydro for the period 1983-93 and beyond and to report its findings and recommendations to the Government, so that an approved framework can be decided upon for Ontario Hydro in planning and implementing the electrical power system in the best interests of the people of Ontario;

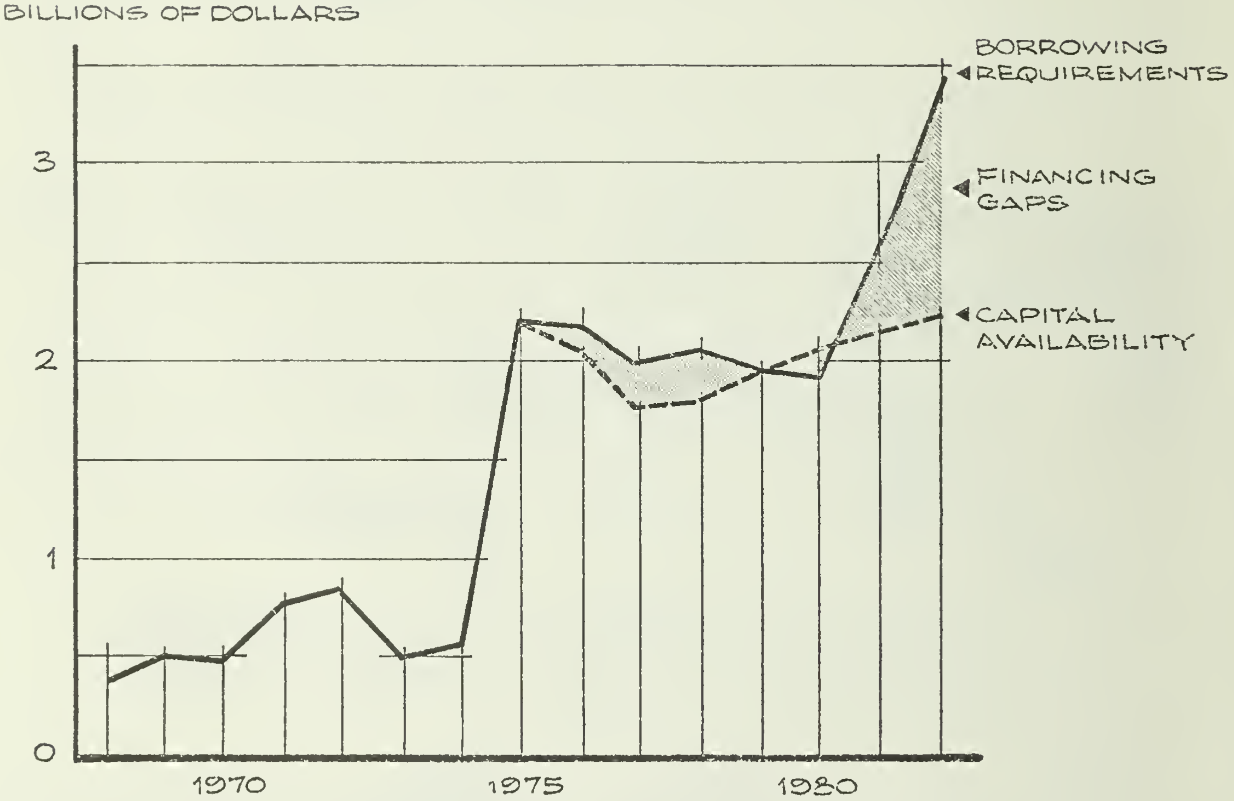
2) Inquire comprehensively into Ontario Hydro's long-range planning program in its relation to provincial planning; to domestic, commercial and industrial utilization of electrical energy; to environmental, energy and socio-economic factors, including but not limited to matters such as electric load growth, systems reliability, management of heat discharged from generating stations, interconnecting and power pooling with neighbouring utilities, export policy, economic investment policy, land use, general principles on the siting of generating stations and transmission corridors, efficient utilization of electrical energy and wise managment (conservation) of primary energy resources, power generation technology, security of fuel supplies and operational considerations;

3) Deal primarily with the broader issues relating to electric power planning, and thus serve to alleviate the need for re-examination of these issues at subsequent hearings of specific details such as siting, rates, etc.:

4) Consider and report on a priority basis on the need for a North Channel Generating Station, a second 500 K.V. line from Nanticoke to London, and a 500 K.V. line in the Ottawa-Cornwall area, and other projects as may be directed by the Lieutenant Governor in Council.

Exhibit II-3

THE PROVINCE IS FORECASTING A SUBSTANTIAL FINANCING GAP FOR HYDRO IN THE EIGHTIES



SOURCE - ONTARIO TREASURY ESTIMATES.
SUBMISSION TO ROYAL COMMISSION ON ELECTRIC POWER PLANNING

New Objectives for Electric Power Planning

New Objectives for Electric Power Planning

PART III

NEW OBJECTIVES

FOR ELECTRIC POWER PLANNING

Since its inception, the mandate of Ontario Hydro has been to meet future demand for electricity, as a reliable supplier, at the lowest feasible long-term cost. Prior to the borrowing constraints imposed by the Treasurer in January 1976, the Select Committee had begun to consider whether the changing atmosphere in which Hydro operates necessitated a rethinking of the appropriateness of Hydro's traditional mandate. In particular, the Committee began to consider, during its analysis of Hydro's planning objectives, whether an appropriate balance was being struck between the effort in developing generation facilities and the effort in developing measures to implement conservation and load management; whether Hydro was setting appropriate planning targets for reliability; and, whether Hydro was developing its generating facilities in a manner consistent with sound economic planning for the Province as a whole.

Hydro has traditionally started its planning process with a forecast of the long-term expected demand for electrical power and energy. Until 1973, it attempted to influence demand only to the extent of encouraging high rates of consumption. Increased consumption enabled Hydro to achieve economies of scale that helped to keep rates down. Over the past three years, Hydro has shifted the emphasis of its promotional activities away from load building and towards energy conservation. This shift is an explicit recognition of the change in Hydro's economic structure: increased consumption now leads generally to higher costs, not to economies of scale.

Hydro is committed to maintaining a high quality of electrical service. The major component of quality of service is the reliability of the power supply to customers. While the reliability of power supply is dependent upon the reliability of the bulk transmission network as well as the availability of reserve generation capacity, Hydro places the greatest importance on its generation program. Traditionally, it has planned to add generating capacity to maintain very high standards of generation reliability. The new capital constraints have forced Hydro to plan a system expansion that does not meet its standards of generation reliability.

Hydro has chosen a mix of new generation to meet reliably the forecast demand in a way that best balances long-term low cost, security of operation, safety and environmental considerations. At this time, Hydro's basic choice of electric generating technology is the large, multi-unit CANDU nuclear station. Hydro is now being forced to defend this choice against a wide array of critics. Some argue that nuclear generation is unsafe; others that it is too expensive. It is now not clear whether Hydro's choice for the Province will prevail.

Over the past several years, a confluence of diverse factors has raised critical planning issues for Hydro. These include the sharp decrease in economies of scale, the sharply increasing financial burden of providing new capacity, an expanding awareness of finite energy resources, the adverse effect on society and on the environment of an unbridled growth ethic, and the knowledge that the Ontario Government has thought it necessary to intervene directly in its affairs. As a result, Hydro operates in a significantly different atmosphere than before.

In four chapters, this part of the report presents the Committee's conclusions and recommendations on the critical planning issues. The first chapter addresses the question of how much demand Hydro should plan to meet. It notes that the natural demand growth will be lower than the historic trend, but recommends strongly that Hydro set even lower demand targets - based on specific conservation objectives to reduce the continued waste of electrical energy, and a load management program that reduces the annual peak for which generation is built. In the second chapter, the Committee considers an appropriate level of reliability for the generation system. Now that reliability levels are being publicly questioned, it recommends that Hydro develop a more appropriate measure of reliability. Until the new measure is developed, it recommends that Hydro retain the same planning standards but place an explicit value on the interconnecting tie-line system. In the third chapter, the demand and reliability targets are brought together to show that Hydro should be developing a new generation expansion plan considerably scaled down from the current plan. The Committee recommends that the new generation plan include a critical reexamination of the current planned generation mix, and that arrangements be made for a public review of nuclear generation. Finally, in the fourth chapter, the Committee turns to the critical question of a follow-up mechanism to ensure that its recommendations are implemented by the Government and by Ontario Hydro.

CHAPTER III-1

SETTING TARGETS FOR LOAD GROWTH

The first step in system expansion planning is to determine the level of future demand that must be serviced. Traditionally, Hydro has attempted to forecast the probable growth in demand (usually about 7 percent per year), and relied on that forecast as the level of demand for which it would provide generation. In the Committee's view, this approach is no longer appropriate.

As the hearings progressed, the Committee became increasingly aware of the desirability of slowing the growth rate of electrical demand. The capital intensity of electric generation is requiring Hydro to borrow ever-increasing amounts of money, straining the Province's financial position. It is evident that increases in the amount the Province borrows or guarantees for Ontario Hydro decrease the amount available to the Province for other purposes. This is particularly true at this time, when the Province's credit rating is, apparently, at risk. As well, when the combined borrowing requirements of Hydro and the Province approach a prudent limit, the pressures on the utility to generate more funds internally through higher rates are sharply aggravated.

While demand continues to grow, conventional sources of domestic energy are diminishing. Scenarios presented by Energy, Mines and Resources Canada suggest, for example, that over the next ten years the country's dependence on imported oil could grow to the point where net oil imports may be required to satisfy between 40 and 47 percent of Canada's needs. Earlier hopes of abundant and inexpensive nuclear power have not materialized, and many vital questions about the nuclear program remain unanswered. While fusion, magnetohydrodynamics (MHD) and solar power may offer eventual solutions, these energy sources will not be available in time to prevent the serious disruption of supply that may result from unbridled growth of demand.

Reduced demand will have significant environmental advantages. Problems connected, for example, with transmission line rights of way, selection of sites and generating stations, nuclear safety, environmental disruptions from hydraulic development, and the possible ultimate need to build a plutonium-based system would be proportionately reduced.

The Committee's concerns about growth focussed both on load forecasts and on meaningful and realistic measures that could be taken to reduce load growth without adversely affecting the vitality of the provincial economy. This chapter will present the Committee's conclusions on the probable growth in demand, its recommendations and targets for reducing the forecast growth through conservation, and recommendations and targets for reducing the peak demand while meeting the Province's overall energy needs.

FORECASTING THE DEMAND FOR ELECTRIC POWER

Ontario Hydro's forecast of firm, peak power and energy demand is the foundation for its generation and bulk transmission system expansion programs, and a major element in determining appropriate planning objectives. The Committee looked at the forecasts as a means of assessing the future demand for electricity. Given the continuation of current policies in such areas as pricing and conservation, the Committee tried to determine whether the Hydro forecasting procedure was understandable and whether it produced results that fell within acceptable limits of accuracy.

Making the Forecasting Methodology More Explicit

Hydro prepares two basic types of forecasts. Short-range forecasts aid in, among other things, scheduling in-service dates for equipment, maintenance planning, fuel purchases and secondary sales, as well as in forecasting internally generated capital. The long-range forecasts, and in particular, long-range forecasts of firm, peak power demand,* are those on which system planning is based. In this section of the report, the Committee focusses on the long-range forecasts and makes recommendations on Hydro's forecasting methodology and current ten-year forecast.

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*- Firm, peak power demand is the largest demand for power, lasting at least 20 minutes, made on the system during any given year (excluding exports and interruptible contracts). In Ontario the peak demand invariably occurs during the winter months.

In examining the long-range forecasts, it became apparent that over the past 50 years, Hydro had witnessed a remarkably constant rate of growth of demand. The rate of growth over that period has averaged approximately 7 percent a year. This is a very high long-term rate of growth, and results in a doubling of demand about every ten years. While periods of unusual economic activity, war or recession have caused short-term variations in the pattern, the average yearly rate of growth has remained relatively uniform over the past five decades (Exhibit 1). Hydro has based its forecasts of future demand growth on this material characteristic, maintaining that forecast deviations from such a long and established trend must be fully explained and justified. However, the Committee noted that Hydro's past forecasts were made in periods where economic, social and basic energy conditions were considerably different than they are today. This is a critical concern in light of the need for load forecast data that are as reliable as possible.

In recent years, the rate of consumption of all forms of energy has grown rapidly in Ontario, but the consumption of electrical energy has grown even faster. From 1958 to 1973, total energy consumption grew at an average annual rate of 4.9 percent. To attain this overall growth rate, it was necessary for per capita consumption to rise 2.8 percent per year. Meanwhile, the consumption of electrical energy grew at an annual rate of about 6 percent over the same period, with per capita consumption growing at about 4.5 percent per year. Electrical energy accounted at the end of the period for 14 percent of energy consumption - up from 11 percent in 1958 (Exhibit 2).

The demand for electricity depends upon a large number of factors, such as: the size and make-up of the population; the saturation of markets for electrical appliances; the level of family income; government and utility policies; the availability and price of substitute fuels; conservation and environmental concerns; overall provincial economic growth; the relative growth rate of specific sectors; new technology; and the price of electricity. Many of these factors appear to be changing more rapidly and less predictably than at any time during the past 50 years. For example, in a departure from historic trends during the past several years, inflationary conditions have outpaced the technology and productivity advancements of the electric utilities. A newly aware public accords greater urgency to conservation and environmental considerations that were largely overlooked in the past. Interest rates at historic highs, tighter capital markets and increasing capital intensity are causing the electric utility industry to make capital investment decisions that deviate from past practice. Higher relative prices for electricity, coupled with rate structure revisions, will tend to impact on demand in ways not generally experienced when relative electricity prices were constant or falling. The rates of population growth and of household formation are expected to decrease from historic levels.

With such substantial changes occurring in the factors that contribute to demand growth, the Committee considered carefully the forecasting methodology employed by Ontario Hydro. The adequacy of the forecasting methodology has been demonstrated over the years by Hydro's load forecast record, which is excellent in comparison with those of other utilities. Its methodology appears to begin with an extrapolation of past trends on a small regional basis, then adjusts the totalled results, based on various judgements, and checks the reasonableness of the result against broad economic forecasts. Hydro believes that its process, by relying on input and judgement from regional people, as well as the expertise of its knowledgeable economist in charge of load forecasting, identifies all of the relevant factors influencing electricity consumption and accounts for them to the maximum practical extent. In the view of the Committee, the process captures most of the relevant factors. However, the Committee found it virtually impossible to differentiate those captured during the main forecasting process from those included in the highly subjective final adjustment phase. In addition, the process does not permit a direct test of the effect of different assumptions on the eventual load forecast. Because it appears likely that important social, economic and demographic changes will impact directly on the future growth of demand for electricity, it is essential that the process capture these changes as accurately as possible. Because Hydro will be appearing regularly before public bodies (such as the Ontario Energy Board), it is essential that the impact of changes in underlying trends be identifiable. In light of the significant variations from recent historical trends, and the importance of reliable and understandable long-range load forecasts, it appears Hydro needs to supplement the forecasting techniques it currently employs.

The Committee recommends that:

III-1 ONTARIO HYDRO DEVELOP AN ECONOMETRIC FORECASTING MODEL THAT WILL ACCOUNT FOR ALL QUANTIFIABLE VARIABLES THAT CAN BE ANTICIPATED TO HAVE A SIGNIFICANT IMPACT ON THE FUTURE DEMAND FOR ELECTRIC POWER.

Forecasting the Demand For the Next Ten Years

The Committee's second concern in long-range forecasting was to determine what the appropriate long-range forecast should be, given all the uncertainties ahead and the absence of a developed forecasting model.

The witnesses appearing before the Committee in order to discuss future load growth, other than those from Ontario Hydro, considered the different variables in a general way, expressing various concerns about the relative impact of each of the many critical factors that impact load growth. The critical factors cited as reasons for a reduction in the growth rate in the demand for electricity include:

- Growth of a conserver society
- Specific electrical conservation measures
- Slower economic growth
- Decreasing consumer purchasing power
- Saturation of markets, and
- Slowing of the natural growth of the provincial population.

On the other hand, witnesses cited several factors as reasons for an increase in the growth rate in the demand of electricity in the medium to long term, including:

- Predictions of gas and oil prices that will be higher than the relative price of elecricity
- A shortage of fossil fuels
- More electric space heating
- Faster economic growth
- Higher family incomes
- New uses of electricity, and
- A possible quickening of the rate of population growth through expanded immigration.

The majority of the Committee's witnesses tended to believe that the percentage increase in the demand for electricity over the next decade would be somewhat below the historic trend. On March 19, 1976, the

Committee was advised by Ontario Hydro that it was forecasting a lower growth in the load for the East System. This latest forecast is below the historic trend, and fell within the consensus of the evidence of the Committee's witnesses (Exhibit 3). Comparison of the current and 1975 forecasts showed that the forecast growth in 1976 had been reduced by 3.6 percent, and that the forecast for 1984 had come down 4.8 percent. Over the past two years, Hydro has dropped the forecast level of load in 1984 almost 10 percent (Exhibit 4). Among the key factors incorporated in the latest forecast that caused a decrease in forecast growth were impending price changes and changing attitudes towards energy utilization.

Hydro has an excellent forecasting record and its latest forecast, incorporating several factors that, realistically, should reduce demand, fell within the consensus of the experts appearing before the Committee.

The Committee recommends that:

III-2 HYDRO'S CURRENT LOAD FORECAST BE ACCEPTED AS THE BASIS FOR ANTICIPATING FUTURE DEMAND, GIVEN NO SIGNIFICANT CHANGES IN GOVERNMENT POLICY.

TAKING ACTION TO CURTAIL ENERGY WASTE

Economic growth has, in the past, been closely associated with the use of energy. The relatively high growth rate of the Canadian economy has been accompanied by sharply increased utilization of energy, to the extent that Canadians are second only to Americans in per capita energy use (Exhibit 5). Recent events are forcing Canadians to come to grips with the implications of this high energy consumption. And, as shown in Exhibit 6, while there is a general relationship between energy consumption and gross national product, there is plenty of scope for reducing per capita energy consumption without necessarily cutting back the GNP. Any overall energy policy today must reflect a balance between concerns for the development of supply and control of demand. Any policy for Ontario Hydro must, equally, balance the building of new generation capacity with an effective conservation program.

The need for energy can be reduced by broad policies that emphasize the substitution of capital and/or labour for energy. Substitution of capital for energy would in the short run include, for example, investing in upgraded insulation in buildings or water heaters. In the long run, it could include substantial changes such as greater use of district heating. Substitution of labour for energy might include improving the frequency of repair to equipment such as leaking steam pipes in an industrial setting or conducting more extensive annual furnace check-ups in the home. Changes of this nature, aided by financial incentives from government, would encourage the introduction of energy saving practices. The energy intensity of our economy could be reduced by broad policies aimed at promoting technological change that could result in constant or increased real outputs from a reduced or stable energy input, coupled with policies aimed at the elimination of energy wastage and policies designed to change consumer behaviour. In the long term, economic policies can assist in slowing the growth of energy consumption while having a minimal impact on economic growth. In the broad sense, the need for energy can be reduced by restructuring final demand in a way that places less emphasis on the production of energy-intensive and energy using goods.

The Committe is concerned that effective action must begin now if conservation is to help in reducing the need for new generating capacity, and in this section presents a number of recommendations for new conservation initiatives. The Committee is aware that there is a wide variation in the degree of analysis behind individual recommendations in this section, and that some of the recommendations are beyond the jurisdiction and responsibility of either Ontario Hydro or the Government of Ontario. The Committee hopes, however, that its recommendations may be useful to government in formulating energy policy, and will encourage cooperation between the Ontario Government and the Government of Canada. As well, the Committee notes that its recommendations relating to conservation and load management do not consider the implementation of policy; they are primarily concerned with what should be done, rather than how it should be done. The Committee recognizes also that its consideration of the appropriateness of implementing conservation initiatives was not exhaustive, that other necessary and valid initiatives exist, and that not all the recommendations have been made in the same time perspective. In making the following specific recommendations, the Committee is emphasizing that, in its view, Government has a responsibility to ensure that new technology becomes incorporated into future developments.

The Committee's recommendations are divided among the three demand sectors - residential, commercial and industrial - followed by two general recommendations. The growth rate and relative share of overall demand for each sector is quite different, as shown in Exhibit 7. Compared to an overall growth for all sectors of 7.1 percent per annum, residential consumption grew at an average annual rate of 8.3 percent between 1966 and 1974, and thereby increased its share of total electrical energy consumption from 28.8 percent to 31.4 percent. The commercial sector, including offices, schools, hospitals, etc., was the fastest growing sector at 11.1 percent per annum. Its share grew from 20.3 percent to 27.2 percent. In contrast, industrial consumption had a slower growth than the overall average. It grew only 4.4 percent per annum, although it still had the largest share of the market at 41.4 percent, down from 50.9 percent in 1966.

Bringing Down Residential Consumption

In the residential sector, the average annual growth of demand of about 8 percent is about four times the rate of growth in population.

A significant factor in the large increase in per capita use of electricity has been the trend of rising per capita personal income, combined with a decline in the relative cost of electricity and lower appliance prices (Exhibit 8). This may have contributed to the use of larger and more energy-intensive appliances. A U.S. study has shown, for example, that the typical North American refrigerator has increased its annual electric consumption from about 345 kwh in 1950 to about 800 kwh in 1960, and to about 1800 kwh in 1970 (Exhibit 9). In Ontario, there has been growing use of most electrical appliances such as clothes dryers, freezers, dishwashers and automatic washers, and startling growth in electric space heating. In 1958, less than 1 percent of new dwelling starts were electrically heated; by 1975, electric heating enjoyed a steady 25 percent share of installations in new dwellings. Electricity now heats about 10 percent of Ontario homes (Exhibit 10). The Committee heard evidence from R. T. Tamblyn that Ontario Hydro was dangerously underestimating the potential for conversion from fossil to electric heating of homes. The electric share of the space heating market could grow dramatically if older homes start to be converted to electricity at moderate rates. At even a 5 percent conversion rate, additional generation would be required to meet the added demand (Exhibit 11). While not sharing Mr. Tamblyn's concerns about the magnitude of the problem, the majority of the Committee's witnesses agreed that electric space heating would be a significant factor in future load growth.

The Committee concluded that an appropriate and obvious counterbalance would be better housing insulation. The Ontario Government has recently increased the insulation standard for all new housing to the old electric standard. However, analysis showed that this standard does not anticipate probable price increases. In other words, homeowners would be saving money - as well as vast quantities of energy - if the standards were increased.

The Committee recommends that:

III-3 THE ONTARIO GOVERNMENT INCREASE INSULATION STANDARDS IN ALL NEW HOMES TO A LEVEL THAT IS JUSTIFIABLE ON THE BASIS OF EXPECTED FUTURE ENERGY PRICES.

It is clear that within the existing residential market generally, the upgrading of overall insulation levels is one of the areas offering the greatest potential for near-term energy savings. The addition of ceiling insulation, storm windows, storm doors and necessary caulking has significant conservation potential. It is essential that homeowners be encouraged to improve overall insulation levels in their own homes. One good approach would be to highlight the financial benefits - the actual dollar savings resulting from the installation of energy saving devices - and to assist the consumer to make the necessary investment.

The Committee recommends that:

III-4 THE ONTARIO GOVERNMENT MAKE FINANCIAL INCENTIVES GENERALLY AVAILABLE TO ENCOURAGE THE INSTALLATION OF ENERGY SAVING EQUIPMENT IN HOMES THROUGHOUT ONTARIO.

The Committee learned of the vast differences in the efficiencies of various appliances and the impact that improvements in efficiency could have on overall demand levels. Electric air conditioners, for example, have little competition from other fuels. Their growth depends solely on consumer acceptance and initial capital cost. There is such a wide variation in the energy efficiency of room and central air-conditioning systems that significant energy savings could result from the establishment of energy efficiency standards. One study has shown that for the same amount of cooling, the least efficient air-conditioning model uses 2.6 times as much electricity as the most efficient one. Aside from energy savings, this information could have considerable economic advantage to the consumer over the life span of the unit.

As another example, the saturation level for electric refrigerators has reached almost 100 percent in Ontario. The use of electricity for refrigeration represented 13.8 percent of the total residential load in 1974, having increased significantly since 1961. This can likely be attributed to several factors, such as the increasing size of the units, introduction of a frost-free option, heat-transfer characteristics of the walls and devices such as automatic ice cube dispensers.

Data on the average electricity consumption of refrigerators, air conditioners and other appliances have led the Committee to conclude that it would be desirable to have minimum energy efficiency standards for appliances set by the Government of Canada, with tests by independent laboratories to ensure compliance. As a base requirement, the Federal Government should insist that the average electricity use for a particular model of any appliance, relative to the minimum standard, be made known to the consumer by a stamp that cannot be removed from the appliance prior to sale.

The Committee recommends that:

III-5 THE ONTARIO GOVERNMENT PUBLICLY URGE THE GOVERNMENT OF CANADA TO SET MINIMUM ENERGY EFFICIENCY STANDARDS FOR ALL APPLIANCES AND TO REQUIRE ALL MANUFACTURERS TO SHOW ON EACH APPLIANCE NORMAL ELECTRICITY USE RELATIVE TO THE MINIMUM STANDARD.

Residential electric water heaters reached 66 percent saturation by the mid-1960s, but have declined to a 53 percent saturation level today. The average residential consumption of electricity for water heating has not, however, shown a corresponding drop. This can likely be attributed to two major factors. First, there is an increasing amount of hot water consumed in the home as a result of the increasing saturation of automatic dishwashers and clothes washers, resulting in a demand for bigger units. Second, the introduction of hot water systems capable of quicker recovery and offering almost unlimited supply of hot water has eliminated the necessity of careful planning of household functions, and encouraged greater hot water use. An energy conservation expert from Ontario Hydro presented evidence that better insulated water heaters would be efficient and conserve energy, thereby offsetting some of these trends.

The Committee recommends that:

III-6 THE ONTARIO GOVERNMENT SET INSULATION STANDARDS THAT CAN BE JUSTIFIED ON AN ECONOMIC BASIS FOR ELECTRIC WATER HEATERS.

During its examination of the residential sector, the Committee heard evidence that electricity use in the individual units of bulk-metered apartments and townhouses was 34.5 percent higher than in individually metered apartments. When the bulk metering was introduced, the local utility realized the savings from the installation of fewer meters, simpler internal wiring, fewer meter readings and simplified billing. Ontario Hydro has acknowledged that this is a clear illustration of a change in circumstances that renders a particular policy counterproductive.

The Committee recommends that:

III-7 ONTARIO HYDRO AND THE MUNICIPAL UTILITIES CEASE BULK METERING APARTMENTS AND TOWNHOUSES AND STUDY THE FEASIBILITY OF RETROFITTING EXISTING BULK METERED BUILDINGS.

Finally, the Committee heard evidence that development of known technology could offer significant savings within a relatively short period of time. For example, it learned that electrically driven heat pumps are more energy-efficient than resistant heating. An increase in the percentage of electrically heated homes with heat pumps would be advantageous from an energy conservation viewpoint. While the heat pump was essentially designed for warmer climates, the Committee was advised by H. West of Ontario Hydro that additional research could produce significant improvements. Another area where potential savings are indicated is in the addition of thermal storage units to all kinds of furnaces. A third possibility offering significant potential is the design and siting of buildings so that they act as passive collectors of solar energy.

The Committee recommends that:

III-8 THE ONTARIO GOVERNMENT MAKE AVAILABLE ADDITIONAL RESEARCH FUNDS FOR THE DEVELOPMENT OF ENERGY SAVING TECHNOLOGY.

Taking Action in the Commercial Sector

The annual rate of growth of electric consumption in the commercial sector has been very rapid. Between 1966 and 1974, the annual growth rate averaged 11.1 percent - far greater than that of any other sector. The difficulty with this sector, however, is that even though the opportunities for conservation are substantial, so many different kinds of users are included in the sector that it is difficult to generalize about conservation measures. One general problem might be with the tax system. Many of the conservation measures considered in this sector involve owner investments to produce energy savings that are substantial but, under the present tax system, may not be justified by the cash payback of reduced energy costs. For example, fuel costs for the owner of an apartment building are 100 percent deductible from income in the year they are incurred, while significant investments in energy saving equipment must be capitalized and written off over several years. In the view of the Committee it is necessary for Government to offer some financial incentives to dramatize potential savings and thereby spur the implementation of conservation measures in the commercial sector.

The Committee recommends that:

III-9 THE ONTARIO GOVERNMENT MAKE FINANCIAL INCENTIVES GENERALLY AVAILABLE TO ENCOURAGE INVESTMENT IN ENERGY CONSERVATION-RELATED EQUIPMENT IN THE COMMERCIAL SECTOR.

Office buildings might be one part of the commercial sector where a more specific approach could be used. The evidence of wasted energy in office buildings can be seen everywhere, from lights that burn where or when they are not needed, to over air conditioned buildings where everyone wears sweaters, to high rise towers where a few panes of glass provide the only insulation.

Evidence presented to the Committee showed that the average consumption of energy in office buildings could be dramatically reduced using conventional and currently available technology (Exhibit 12). There is a great need for immediate Government action in this area.

The Committee recommends that:

III-10 THE ONTARIO GOVERNMENT ESTABLISH ENERGY EFFICIENCY STANDARDS AT AN ECONOMICALLY OPTIMAL LEVEL FOR ALL NEW COMMERCIAL STRUCTURES.

Providing Assistance To Industry

The industrial sector is still the largest user of electrical energy, although its annual rate of consumption growth is the slowest. Since electrical energy is the dominant form of industrial energy (Exhibit 13), Government encouragement of overall energy conservation will assist in electrical conservation.

Witnesses appearing before the Committee pointed out the significant economic benefit to industry of energy conservation - especially as prices rise. However, since energy costs are typically a small proportion of industry cost (Exhibit 14), it may be difficult to get concerted industry action. One approach is to try to establish a conservation ethic through promotion and education. Both the federal and provincial governments and Ontario Hydro are following this approach. A more concrete step at this time of overall capital shortage would be to establish a revolving pool of funds. Capital could be borrowed from the pool for energy saving projects, and repaid from the economic benefit of reduced energy consumption. Ontario would benefit from more productive industry and lower energy consumption.

The Committee recommends that:

III-11 THE ONTARIO GOVERNMENT SET UP A REVOLVING CAPITAL POOL WHICH WOULD BE AVAILABLE FOR INDUSTRY FOR ENERGY SAVING PROJECTS.

The second, and potentially more substantial, area was suggested to the Committee by A. J. G. Leighton, who pointed out that the efficiency of industrial energy use would be improved by the joint use of facilities for electric generation and process steam. Where process heat is used, the extra fuel required to generate electricity is less than 40 percent of that required by a utility for the production of electricity. Of course, industrial generation of power in this manner helps to alleviate the burden on the public utility of providing generation facilities as well. In West Germany, 29 percent of the electricity is generated by self-producers, suggesting that a large increase in the industrial generation of electricity, combined with the production of process heat, should be possible in Ontario. Industry, however, will need well-defined incentives and assistance to increase the utilization of its potential for generating electricity from waste heat.

The Committee recommends that:

III-12 THE ONTARIO GOVERNMENT TAKE THE LEAD IN INCREASING INDUSTRIAL ELECTRICITY GENERATION.

Setting Out a General Conservation Framework

The recommendations above are an indicative list, designed primarily to encourage the Government to act more vigorously in energy conservation. There are two general guidelines for conservation activity. Price must not be the basis of conservation, and the Province must join Hydro in a commitment to specific conservation targets.

The Committee heard a great deal of evidence about the use of electric rates as a conservation tool. Generally, the witnesses agreed that, although the response of electricity consumption to rising prices is not known with any accuracy, there is some response: a higher price will discourage consumption. Many witnesses urged that electricity be made more expensive in the interest of conservation. It was suggested that as the price of electricity increases, more opportunities to make economic savings are created. It was also suggested, however, that within the limits of conceivable price increases, short-run price elasticity is minimal, due mainly to the fact that consumers are unable to make substantial changes to the electricity using appliances that they currently own.

As the Committee was aware that the Ontario Energy Board has scheduled a costing and pricing hearing for the fall of 1976 to consider a new design of rates, it did not probe the issue of rate design in detail. It is, however, concerned about the overall level of rates.

The Committee recommends that:

III-13 THE ONTARIO GOVERNMENT ENSURE THAT THE OVERALL LEVEL OF ELECTRIC RATES NOT BE INCREASED SOLELY FOR CONSERVATION PURPOSES.

The Committee was impressed, throughout the hearing, not only by the potential for energy conservation, but as well by the fact that significant conservation objectives are not achievable in the short term, but only through a compounding process over the long term (Exhibit 15). It is the Committee's view, therefore, that a cohesive conservation policy and specific conservation programs must be adopted as soon as possible.

During the latter stages of the hearing, Ontario Hydro advised the Committee that it was now embarking on new, non-coercive but direct, conservation initiatives of an entirely different order of magnitude than anything it had previously attempted. These new initiatives were to be directed towards specific conservation objectives. Ontario Hydro advised the Committee that conservation has become its number one corporate priority. The corporation agreed with the testimony of expert witnesses that load growth can be substantially reduced without serious interference with the vitality of the Ontario economy. The Committee noted, however, that while the targets are commendable, Ontario Hydro was not able during the hearing to announce any new conservation programs. Still, the Committee was impressed by the tough objectives Ontario Hydro has set for itself. The objectives lie within the range of economically justified conservation potential set out by expert witnesses, and in that sense, are realistic, but, in the view of the Committee, they will only be achieved if the complete support and cooperation of the Government of Ontario is received. Specifically, the provincial energy management program must not work at cross purposes to Hydro's programs. The Ontario Government must formulate an energy policy consistent with and beneficial to Hydro's targets, and must be prepared to support the program with legislation, regulation, funding or tax schemes where necessary. Available information indicates that the governments of many European countries have recognized the importance of special measures aimed at energy saving. Most European governments have introduced legislation in this regard, and are studying the possibility of further measures for this purpose. In many countries, energy conservation is now considered a major aim of long-term economic policies and plans. Scientific and technological research on energy efficiency and economy is being accelerated. The charts included as Exhibit 16 give a very general indication of the range and vigour of the activities being undertaken throughout Europe at this time. While the energy saving measures introduced vary widely as a result of differences in political and economic systems and the availability of energy resources, it is evident that the industrialized world is giving increasing attention to the need for substantially greater energy efficiency and economy.

In light of the cuts in Hydro's system expansion plans, the achievement of the conservation target levels is a necessity the Committee believes can and will be met. It accepts the Ontario Hydro conservation targets as a valid and realistic reduction in forecast load for its projections. When the conservation targets are combined with the latest load forecast, it is evident that the load for which generation had been planned has been substantially reduced, bringing Ontario Hydro's reserve margin, after the stretch-out of its generation program, very close to its reliability standard until 1985.

The Committee recommends that:

III-14 ONTARIO HYDRO, THE ONTARIO GOVERNMENT AND THE ONTARIO ENERGY BOARD CONSIDER THE EFFECTIVE AND EFFICIENT USE OF ELECTRIC ENERGY AN ISSUE OF EQUAL IMPORTANCE TO THE CONTINUANCE OF A RELIABLE AND ADEQUATE SUPPLY. FURTHER, THAT ONTARIO HYDRO'S SPECIFIC CONSERVATION TARGETS BE ACCEPTED AS A GOVERNMENT COMMITMENT AND BE INCLUDED IN ALL SYSTEM EXPANSION PLANNING.

MANAGING THE PEAK

To fulfill its mandate, Ontario Hydro has attempted to build a generation and bulk transmission system that is capable of meeting the forecast peak power demand while staying within its standard of system reliability. As a result, the Committee focussed its attention specifically on the possibilities for reducing the peak demand. In the long term, a slowing in the growth of peak demand should result in two distinct advantages for the system. First, it should increase the system load factor, or in other words, reduce the amount of total generation capacity required to meet a given growth in demand for electrical energy, bringing capital savings. Second, reducing the peak demand would increase Ontario Hydro's ability to supply more of the Province's total power requirements from its more efficient generating stations, resulting in lower cost energy. The Committee specifically considered the possibility of transferring part of the daily peak load to other times of the day when the load levels are lower. In this part of the report, it sets out the peaking problems, recommends the launching of load management targets, and sets targets for a load management program.

Setting Out the Peaking Problem

The peaking problem is forecast to get worse in the next decade, but Hydro is reluctant to launch new initiatives to overcome it. At least three factors increase the possibility that the peaking problem may very well get worse in the future: the energy conservation program, the growth in electric space heating and the expected reaction to the current rate structure.

§ Energy conservation program: Hydro's current load plan estimates a reduction of about 8000Mw in 1982 from its forecast of the natural growth in peak demand as a result of its conservation program. Hydro made the point that it is much more difficult to achieve energy savings during the peak time of the day than at other times of the day. Hydro's rough estimate was that in the short run, a given reduction in residential and commercial energy consumption will reflect only a 50 percent reduction in peak demand, whereas conservation in the industrial sector will have a more even impact across the day. A successful conservation program would therefore accentuate the "peaks and valleys" on the daily load curve by causing a greater percentage decrease in the valley than in the peaks, as shown in Exhibit 17.

§ Electric space heating: There has been a change in the characteristic of the winter load in Ontario. In the past, the load rose quickly in early December, typically reaching a peak the week before Christmas, and then declined quite rapidly after Christmas. As a result of the increase in electric space heating, the system's yearly peak may now occur at any time from the beginning of December to the middle of February, depending on the temperature.

§ Current rate structure: Hydro computes two charges to its customers for their consumption of bulk power. There is a charge for the total amount of energy consumed during the period (the kilowatt hours) and an additional charge for the maximum demand at any given moment during the month from the customer (the kilowatts). As a result of increased costs of fuel, the electrical energy rates (for total kilowatt hours consumed) are rising faster than the rates for the maximum level of demand. Hydro's bulk power customers will be encouraged by the price changes to curtail their energy consumption more than their peak demand. Other things being equal, this will result in a decrease in Hydro's load factor (or a more accentuated peak). If, in addition, as most experts suggest, peak demand is less elastic (or responsive to price changes), the peaking of demand will be accentuated even further.

Currently, Hydro attempts to moderate its peaking problem by a combination of interruptible contracts and peaking hydraulic stations. Hydro accepts that substantial further load management will become feasible and necessary in the period after 1980, but has expressed several concerns about putting into immediate effect a tough, new load management program. First, it believes that the immediate implementation of load management techniques aimed at reducing daily peaks would result in inadequate use of the peaking hydraulic and pumped storage installations it now has in place. Second, if the load were managed on a seasonal basis (moving the winter load to the summer), completion of the planned maintenance programs now carried out in the non-winter months could become more difficult. Further, Hydro believes that load management should not be undertaken prior to further analyses comparing the costs and advantages of load management to further installation of peaking generation.

Hydro's concern that the immediate implementation of load management techniques would reduce the usefulness of its current peaking and hydraulic pump storage facilities suggests that a load management program may have significant impact prior to the 1980s. The Committee's view is that a program should be implemented as soon as possible, with some flexibility to permit rapid expansion of its scope and strength, since the impact in the early years is likely to be small. With Hydro's approach, the risk is that too little will be done too late. As well, Hydro's efforts should be directed at shifting load from the daily peak to other times of the day rather than transferring load from one season to another. This will minimize any difficulties in the completion of planned maintenance during the lower summer load period.

Launching Load Management Programs

The Committee examined three broad areas of load management potential: rate design, increased interruptible sales and various load shielding techniques.

First, it heard evidence of the importance of rate design in managing load patterns. Testimony was given on the importance of such matters as off-peak rates for industrial customers, peak load pricing for all customers and the possibilities for installing meters to measure each customer's contribution to peak demand. The evidence concentrated on the importance of the various charges for electric power reflecting the cost of supply and the negative impact of not reflecting the cost of supply on both the conservation program and load management. In a presentation to the Committee entitled "Costing and Pricing for the Future; A Response to Scarcity," Hydro stated that the need to control growth means closer scrutiny of costs and pricing policies, but more than that, it means greater concern with the basic input resources (capital and primary energy) demanded of society by Ontario Hydro on behalf of its customers.

The Committee is aware that Hydro has embarked on a major review of its costing and pricing policies, and that a major costing and pricing hearing is scheduled to take place in the fall of 1976. It did not, therefore, probe the issue of rate design in detail, but it is concerned about the direction of change in the rate structure.

The Committee recommends that:

III-15 ONTARIO HYDRO CONSIDER THE DESIGN OF ITS RATES AN IMPORTANT TOOL IN FURTHERING REASONABLE LOAD MANAGEMENT OBJECTIVES.

The second area identified by the Committee is increasing the sale of interruptible power to industry. Currently, Hydro has only a moderate volume of interruptible sales at fairly small discounts from the regular price. The discount is so small because, as shown in Exhibit 18, there have been very few interruptions in the past few years. The Association of Major Power Consumers (AMPCO), has consistently stated that industrial customers would utilize interruptible power whenever it is cost effective for them to do so. AMPCO's argument before the Ontario Energy Board in 1976 stressed that interruptible power should be encouraged as an alternative to generating capacity, and should be priced to recognize its use and the benefits that accrue to the system because of it. Many industries could install extra processing and storage facilities, so that if a major portion of the power supply were curtailed, part of the plant could operate on a residual block of firm power and production would be maintained. In the view of the Committee, it would be advantageous to encourage industry to enter into interruptible contracts at realistic prices that essentially operate to the benefit of the entire utility system as an aid in lowering the future requirements for additional generation.

The Committee recommends that:

III-16 ONTARIO HYDRO AND THE MUNICIPAL UTILITIES ACTIVELY PROMOTE THE SALE OF INTERRUPTIBLE POWER TO INDUSTRY AND ENSURE THAT THE PRICING OF INTERRUPTIBLE CONTRACTS REFLECTS THE REAL SAVING TO ONTARIO HYDRO.

Finally, the Committee heard evidence of various technically feasible methods that could be employed to manage peak demand. Nearly all interruptions of service to the typical customer are traceable to difficulties in the distribution system. There has not been a system interruption as a result of lack of generation in Ontario for more than 25 years. If the standard of reliability of the distribution system continues to improve, the quality of service to the typical customers may be maintained even if there are occasions when the system's peak demand exceeds available generating capacity.

It is possible to formulate comprehensive plans to minimize the impact of those rare instances in which available generation capacity may be insufficient to meet the demand. Some reductions in peak demand could be achieved by temporary voltage reductions and, if necessary, selected loads and load areas could be interrupted briefly and in turn. D. Cass-Beggs and R. A. Kampmeier suggested that no industrial customer should be entitled to more than a fixed amount of firm power. Additional power would be supplied on the basis that it could be interrupted in an emergency. The interruptions could be made with or without compensation. As the customer would be aware of the arrangement in advance, it could set up and plan its operations, knowing that at certain times the emergency interruptible portion of its load could be cut off. There would, therefore, be many more interruptible customers, and interruptions to these customers might occur more frequently than in the past.

A. J. G. Leighton spoke of the installation of electrical load control equipment to improve daily load factors. The Committee learned that for industries with a relatively low plant load factor, the installation of inexpensive electrical load control equipment, when combined with some process change, can often produce a substantial reduction of peak demand.

Ontario Hydro provided an example of a "load-shedding" arrangement that it has recently worked out with paper companies in Northwestern Ontario whereby the companies could be interrupted at various times with compensation. R. T. Tamblyn gave evidence to the Committee about the availability of thermal storage technology for taking commercial space conditioning off peak.

Some municipal utilities control their water heating loads at present to reduce their peak demand on the system. Experiments to control, for short periods of time, other household loads, such as clothes washers and dryers, dishwashers, freezers and even electric space heaters, have been undertaken elsewhere.

Load management is not a novel concept. In the United States, a significant amount of research and development is currently taking place in this area. Load management has been practised in several European countries for many years. The Federal Government, in its recent paper "An Energy Strategy for Canada - Policies for Self-Reliance," issued under the authority of the Minister of Energy, Mines and Resources, announced that it is prepared to encourage studies of load management techniques by sharing in the cost of demonstration projects deemed to be in the national interest. Ontario Hydro should apply as soon as possible for funding assistance in the development of its program. It is likely that some of Hydro's feasible options will require back-up support from the Government and Legislature.

The Committee recommends that:

III-17 THE ONTARIO GOVERNMENT AND ONTARIO HYDRO DEVELOP AND IMPLEMENT A LOAD MANAGEMENT PROGRAM.

Setting Load Management Targets

Since a forecast of the probable future peak demand is a critical element in system expansion planning, the Committee is concerned that provision be made now for the effect of load management on the future system peak. In response to downward revisions in its capital programs, Hydro quickly adopted new conservation targets. Hydro is basing future planning on the assumption that the conservation targets will be achieved. Further, the details relating to the implementation of the new programs are just now being determined and only limited evidence was available on how the objectives were arrived at.

The Committee concluded that it would be appropriate for Hydro to take the same approach to setting load management targets as it took in setting conservation targets. The Committee is aware that there are many currently unused options available and that load management has worked in other jurisdictions. The Committee is equally aware that the development and implementation of load management techniques will take some time since results cannot be achieved overnight, but believes that with Hydro's current excess reserve generating capacity, there is no risk of being short of generation even if the targets are not met in the next five years. Finally, the Committee regards setting specific targets as an effective way of providing a focus and incentive for immediate action.

The Committee has chosen a very simple basis for its targets. In the current year, Hydro should be capable of managing at least one percent of its peak demand, or about 140Mw. Next year, a further one percent should be added to the target so that in 1977 the managed peak should be two percent, or 300Mw. A further one percent should be added to the target each year until the peak demand to be managed reaches 10 percent. In 1985, the full 10 percent target will be reached, so that a potential of about 2500Mw should be under Hydro management. The Committee accepts that this is a difficult target, but considers that it is achievable with total commitment on the part of Ontario Hydro and the Government.

The Committee recommends that:

III-18 ONTARIO HYDRO ADOPT IMMEDIATELY, A PROGRAM SPECIFICALLY AIMED AT REDUCING PEAK DEMAND BY A TARGET AMOUNT OF ONE PERCENT PER ANNUM TO 1985.

CHAPTER III-2

SETTING AN APPROPRIATE STANDARD OF RELIABILITY

Hydro's mandate includes maintaining the capability of supplying the electric needs of its customers with an appropriate level of reliability. While technically, reliability encompasses maintenance of system frequency and reasonably steady system voltage (i.e., no brownouts) as well as continuous supply (i.e., no blackouts), consumers usually associate it only with continuity of supply. The ability to supply electric power continuously is dependent upon the transmission and distribution systems, as well as the generating system. The continuity of supply can be affected by inadequate electric generation resulting from mechanical failures at the generating station, unusual water levels or icing at the hydraulic stations, inadequate fuel supplies at the thermal station, or lack of available generating capacity to meet all of the customers' demands. Hydro places the greatest emphasis on the provision of "reserve" generating capacity, as the most critical aspect of reliability planning, and the Committee focussed most of its attention on Hydro's plan for building generation capacity in its investigation of continuity of supply.

Electric utilities' central reliability strategy of building more generation capacity than appears to be necessary is intended to offset the fact that no mechanical system can be totally reliable despite continuous work to improve the reliability of the various components. The apparent excess called reserve allows utilities to keep their system in such a state that it only operates at maximum capacity in extreme circumstances.

Generation facilities are the most expensive part of the system, and require the longest lead time to construct. Thus the level of reserve generation is a critical element in generation planning. If Hydro plans reserves at levels that turn out to be too high, its customers and all residents of the Province will be paying for excess capacity. Hydro estimates that it needs reserve levels of 25 to 30 percent for the next decade. By 1985, that 5 percent range could represent a difference in capital investment of one billion dollars. On the other hand, if planned reserve levels turn out to be too low, building new capacity to restore adequate reliability levels could take several years.

In focussing specifically on generation reserve, the Committee was concerned about developing an understandable measure of reliability, setting an appropriate planning target and determining whether it could assign a value to the system of tie-lines that interconnect Ontario Hydro with its neighbouring utilities.

DEVELOPING AN UNDERSTANDABLE MEASURE OF RELIABILITY

Like most aspects of utility operations, reliability is a concept that seems simple and straightforward, but becomes highly complex as it is more fully developed. There are three factors that make it difficult to assess the adequacy of reliability levels: users probably do not consider reliability as simply a matter of numbers of outages*; measures commonly used are either misleading or hard to understand; and, cross-utility comparisons seem almost impossible to make.

Reliability as the Customer Experiences It

The user is unlikely to differentiate among the various factors that might affect the continuity of supply. There are, however, a number of factors that are important in assessing the degree of reliability of the service that Ontario Hydro provides. The user is likely to consider:

§ The frequency of outages, that is, the number of interruptions or reductions per month or per year. Frequent occurrences are more serious than infrequent ones.

§ The duration of outages, that is, the length of time they last. Long outages are more serious than short ones.

§ The warning prior to outages, that is, whether they begin without notice to users, or Ontario Hydro forewarns those affected. Interruptions or reductions that occur with no notice or inadequate notice are more disruptive than those occurring with adequate notice.

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* - An outage is an interruption of electric power

§ The area affected by outages, that is, whether they are widespread throughout Ontario or confined to a small locality. To the community at large, widespread occurrences are more serious than local ones.

§ The timing of outages, that is, whether they occur during the day or at night, on working days or weekends, in winter or summer. The effect depends on the user's activities at the time.

Therefore, a measure of reliability that is meaningful in the user's perspective must include more than simply an estimate of the frequency of outages over a given period of time.

Reliability as Hydro Measures It

Setting a planning standard for reliability poses considerable difficulty. There are two commonly used measures: one is understandable but not very useful; the other useful but hard to understand.

The simplest and most readily comprehensible measure is the margin of installed generating capacity over the system's annual peak, expressed as a percent. Ontario Hydro has had during the past several years, and expects to have in the future (Exhibit 20), reserve levels of 25 to 30 percent over the system peak. While this measure is understandable, its value, unfortunately, seems difficult to assess:

§ This measure cannot be compared to reserve levels on other systems since such factors as load characteristics, the size, type and mechanical reliability of individual generation units can cause two systems to have similar levels of reliability with widely varying reserve margins.

§ It cannot be used to evaluate the same system over time. As Hydro seeks longer term low-cost power through the economies of scale of large generation units, its required reserve margin will go up. If Hydro were to switch to smaller units, the reserves could go down, but the cost of generation would be higher - even when lower levels of reserve capacity were taken into account.

For some time, Hydro has been using the Loss of Load Probability (LOLP) technique for planning generation capacity. This most widely used and common reliability index gives the expected (long-term average) number of days per year on which the available generating capacity is not sufficient to supply all of the daily peak load. The method of computing the index basically considers the probability that forced outages or deratings and planned or maintenance outages* will reduce generating capacity to a level that is inadequate to meet the demand. The commonly accepted value of this index is one weekday in ten years, or one day in 2,400 days. This means that, on average over a long term, generation will be inadequate to meet the peak load for some undetermined time and in some undetermined amount once every ten years.

The LOLP or, as it is more accurately called, Loss of Load Expectation, does take into account a variety of factors that are the unique characteristics of the utility - specific unit sizes, actual estimates of forced outages, approximate annual load shape. However, the index number of the probability of interruption that results (say, one day or ten days in ten years) is not very useful from the customer's point of view. For example, it gives no indication of how much of the load will not be met: the actual load reduction could be anything from one kilowatt to thousands of megawatts. Nor is there any indication of the duration of the generation inadequacy; it could be a 30-minute loss or as much as 24 hours. Similarly, the index does not give any indication of the other factors the customer considers important; whether a warning can be given, whether the area affected will be large or small, or what the timing will be.

Reliability Compared to Other Utilities

It may be impossible to construct a measurement technique that can relate to all of the consumer's reliability needs. If the index used could be related to a similar index used by other utilities, it would at least be possible to determine whether the Hydro system was aiming at higher or lower levels of reliability than other systems. However, cross-utility comparisons are extremely difficult to make. Even when utilities employ the same reliability index, there is little uniformity in the methods used to calculate it. The chart below shows Hydro's LOLP practices in some of the important areas of difference noted by Dr. A.D. Patton of Texas A & M University that are often found when trying to compare the LOLP calculations of different utilities.

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* - A forced outage is an interruption of electric power that cannot be postponed to a convenient time.

A planned outage is an interruption of electric power that can be postponed from one season to another and is used for overhaul purposes.

A maintenance outage is an interruption of electric power which can be postponed for a short period to a more convenient time.

CALCULATION OF LOLP

Important Areas of Difference	Hydro Practice
Consider or not consider help available over interconnecting tie-lines	Does not consider help available over interconnecting tie-lines
Consider or not consider load forecast uncertainty	Does not consider load forecast uncertainty
Consider or not consider maintenance and, if considered, model exactly or approximately	Only partially and approximately considers maintenance
Treat partial forced outages in detail or through use of effective forced outage rates	Considers partial forced outages through effective forced outage rates
Consider daily peak loads for the entire year, or use of load model in which the year is represented as 12 months equal to the peak load month of the year	Considers daily peak load for the working days of the year

In addition to these differences, Hydro in its testimony pointed out two important factors that are not considered in its LOLP calculations:

§ Uncertainties in in-service dates: An important component of the calculation is the amount of generating capacity that is supposed to be available, including the newest units, at a given time. Hydro's calculations assume that in-service dates will be met, although about 90 percent of the in-service dates are delayed by anywhere from one to 90 weeks - with a typical delay being about 25 weeks.

§ Uncertainties in forced outage rates: The forced outage rate of various generation units varies considerably from year to year. For example, units 7 and 8 at Lakeview had forced outage rates from 1969 to 1975 that varied from less than 10 percent to over 40 percent. Hydro's calculations are based on a single forecast. (Exhibit 21)

In sum, the Committee has learned that reliability from the customer's point of view is not a simple matter; the measures used to indicate the reliability levels of a utility are either understandable but not useful (percent reserve margin), or useful but not very understandable (LOLP); and, cross-utility comparisons are very difficult.

The measurement of reliability is a matter of serious concern to the Committee because of the cost of building and maintaining reserve generation capacity is in the billions of dollars and growing. Without an understandable, reasonably comprehensive measure, it is difficult for the public, the Government and the Legislature to make sense of Hydro's system expansion plans.

The Committee recommends that:

III-19 ONTARIO HYDRO DEVELOP A MEASURE OF THE RELIABILITY OF THE GENERATION SYSTEM THAT INCLUDES ALL SIGNIFICANT VARIABLE, AND INDICATES WITH THE HIGHEST POSSIBLE DEGREE OF CLARITY AND ACCURACY THE FREQUENCY, DURATION AND SCALE OF PROBABLE OUTAGES.

SETTING AN APPROPRIATE PLANNING TARGET FOR RELIABILITY

Despite the inadequacies of the current tools for measuring reliability, the Committee had to work with some standard to reach conclusions about the amount of generation that must be built to meet the Committee's load targets. The Committee accepts Hydro's arguments that simply picking a number for the amount of reserve capacity over the system's peak demand is not satisfactory. The only other developed reliability index to work with is the Loss of Load Probability. Hydro's generation reliability standard is that, over a long period of time, generation should be inadequate to meet the load on an average of once every ten years. The evidence shows that this planning standard is too high, but uncertainties in other areas suggest that, at this time, the standard should continue to be used for planning purposes.

Balancing the Cost and Value of Reliability

In both of the years that the Ontario Energy Board (OEB) has sent a report to the Minister of Energy relating to Ontario Hydro, the Board has indicated that Hydro's reliability targets are too high. In its report following the 1974 hearing, the Board suggested that as customers become aware of the capital-intensive nature of the projected system expansion program and the consequent effect on financing and the cost of power, they will be willing to accept a lower than traditional standard of reliability. Following the 1975 hearing, the Board urged Ontario Hydro to adopt the 1974 recommendation that plant reserve-capacity requirements be reduced. The Treasurer of Ontario seemed to endorse that position in his 1976 Budget. In commenting on the reductions imposed on Hydro's capital borrowings, he noted that "... some reduction will be made in reserve capacity, but this must take second place to the much larger sacrifices that will result if inflation is not brought under control."

The Committee pursued the question of an adequate reliability target with several expert witnesses. Dr. Patton pointed out that it is probably impossible to measure accurately the value of reliability because it is so difficult to put a precise figure on the cost of an interruption. Nevertheless, he noted that studies done in Europe and North America have concluded that power systems built to the traditional North American levels of reliability are probably more reliable than is economically justifiable. These conclusions were corroborated by some other recent research that was drawn to the Committee's attention by its staff.

The Committee also gained valuable insight into reliability standards from the large industrial users that appeared before it. They agreed with the general view that Hydro's reliability standards are too high. The Association of Major Power Consumers (AMPCO) has consistently stated that industry could live with lower levels of reliability, especially if the lower reliability levels resulted in lower power rates. Both the Sierra Club and the Association of Municipalities of Ontario advised the Committee that in their view, reserve levels were too high, a position supported by the Consumers' Association of Canada (Ontario) in argument before the Ontario Energy Board.

It was argued that a power system could plan for lower reliability standards in its generating capacity because this component seems considerably more reliable than the transmission and distribution components. From the customer's point of view, it matters little whether power is lost because of failure in generation, transmission or distribution. Yet in Ontario, the standards for the different components are: virtually total reliability at the generation level; considerable reliability at the transmission level; and, less reliability at the distribution level. These disparities raise two questions. The first is whether it makes sense to have such high reliability at the most expensive part of the system, and the lowest at the least expensive - distribution. The second question, raised by Mr. R.H. Kampmeier, is whether, as transmission and distribution reliability improves, generation reliability can be reduced, thereby leaving the customer in the same relative position.

Balancing the Current Uncertainties

There appears to be ample justification for setting the reliability standard somewhat lower than the current and traditional level. The Committee was inclined to recommend that a lower standard be set for planning purposes. However, the Committee concluded that the standard should not be changed before Hydro is able to include explicitly in its LOLP calculations the uncertainties in meeting the load target and the uncertainties of the nuclear program.

§ Uncertainties in meeting the load target: The Committee has set a load target for Hydro based on Hydro's own reduced load forecast, an extension of Hydro conservation targets and new goals for load management. The Committee recognizes that the new elements in load targetting add to the uncertainties already implicit in load forecasting.

§ Uncertainties in generation availability: The next ten years will see the development of the "nuclear cornerstone" in Hydro's long-term generation plan. According to present plans, by 1985, five nuclear plants will be operating or under construction (Pickering A & B , Bruce A & B and Darlington). These new plants represent not only a commitment to the new technology of nuclear power generation, which is still in an immature stage of development, but a commitment to ever-increasing complexity. Hydro is planning 500 Mw units at Pickering, 750 Mw units at Bruce and 850 Mw units at Darlington. The Committee has noted the erratic performance of the Pickering units (Exhibit 22), and is also aware of unplanned slippages in construction schedules (Bruce A), as well as the major deferrals resulting from the Government's imposition of borrowing limits on Hydro.

There is no provision in Hydro's current reliability index for these uncertainties. Until Hydro develops a measure of reliability that includes all significant variables, and indicates with the highest possible degree of clarity and accuracy the frequency, duration and scale of outages the standard cannot be changed.

The Committee recommends that:

III-20 ONTARIO HYDRO RETAIN, AS AN INTERIM MEASURE, THE CURRENT LOSS OF LOAD PROBABILITY STANDARD OF ONE OUTAGE IN TEN YEARS.

PUTTING A VALUE ON INTERCONNECTIONS

Most of the Committee's concerns about reliability measurement and standards can only be addressed after Hydro has completed the work necessary to comply with recommendation III-19 above. One change that the Committee believes should be included for current planning purposes is that placement of an explicit value on the interconnection system.

Hydro's LOLP calculation does not assign any value to the various interconnection arrangements that Hydro maintains with neighbouring utilities in Manitoba, Quebec, Michigan and New York, or its interconnection with the electrical grid that covers most of North America. In assigning no value to the interconnections Hydro sets the standard that it should not be necessary to rely on neighbouring utilities to meet any deficiencies in Ontario Hydro's generation system more than once every ten years. It seems clear to the Committee that this is a very high reliability standard.

Following the 1974 review of Hydro's system expansion plans, the OEB suggested that "in light of the cost of providing reserve generating capacity, it is not proper for Hydro to assign zero value to the contribution of interconnections to generation reserve requirements." Again following the 1975 review, the Board urged Ontario Hydro "to adopt its 1974 recommendation that ... some reliance be placed on the reserve of adjacent electric utilities." In testimony before the Committee, Dr. Patton corroborated the views of the OEB.

Ontario Hydro has argued that interconnections should not be assigned a specific value in computing generation reserve requirements for two major reasons. First, it argues that neighbouring systems, especially those in the United States, are curtailing their generation plans to such an extent that it is not possible to assign a value to those systems. Second, Hydro argues that the value there might be in interconnections should be considered as a partial offset to several factors, such as strikes, that are not considered in the LOLP calculation.

It is the Committee's view that the deteriorating reserve condition of neighbouring utilities undoubtedly affects the value of the interconnections. However, there is no indication that the situation has deteriorated to such an extent that interconnections are of no value at all. In addition, the Committee has noted that the American utilities are generally summer-peaking systems (i.e., the highest customer demand for electric power comes in the summer), whereas Ontario's system peaks in the winter. Since Hydro is more likely to require assistance in the winter than the summer, it seems to be reasonable to assume that some assistance should be available.

The Committee has noted its own concerns about the omissions from Hydro's reliability index. The Committee believes that these omissions can be balanced against the very high reliability standard rather than the interconnection arrangements.

Hydro presented some theoretical calculations to show the reduction that could be made in reserve requirements if two systems, identical to Hydro, with identical reserve capacities, were interconnected. The value ranged from 1427Mw for two systems operating at a LOLP of 1/2400, to 1074Mw at a LOLP of 10/2400, to 750Mw at LOLP of 100/2400. (Exhibit 23). Given this range of possible values, and cognizant of the potentially deteriorating reliability of Ontario's neighbouring U.S. system, the Committee agrees with the views expressed by the OEB and rejects the Hydro position that no value be assigned to the interconnections. It is the view of the Committee that assigning a value of not less than 500Mw to the interconnection system would be reasonable. In fact, the appropriate value may be 1000Mw or more.

The Committee recommends that:

III-21 ONTARIO HYDRO ASSIGN A REASONABLE VALUE TO THE INTERCONNECTION SYSTEM IN PLANNING THE NEW GENERATION REQUIRED TO MEET THE RELIABILITY STANDARD.

CHAPTER III-3

RETHINKING THE GENERATION PLAN

In the planning of new generation, there are two critical decisions: the amount of generation to be provided year by year and the mix of basic generation technologies to be used.

The amount of generation to be provided year by year depends on the load, or demand, to be met and the level of reserves required to meet the reliability standard, tempered, if necessary, by any financial or other constraint. In the first two chapters of this part of the report the Committee made several recommendations that directly impact the amount of generation to be planned. In Chapter III-1, the Committee recommended specific load targets based on a natural load forecast discounted by specific conservation and load management objectives. In Chapter III-2, the Committee suggested that Hydro's current reliability standard should not be changed but that the calculation of required reserves should include a specific value for the interconnecting tie-lines. In this Chapter, the Committee will compare the effect of its recommendations on the amount of generation required year by year with Hydro's current plan.

The Committee spent some time questioning Ontario Hydro about the second critical decision, the mix of technologies that it has decided to use - and equally importantly, about the technologies that it has discarded. The Committee heard from and questioned outside expert witnesses on this question of optimum generation mix. Basically, the Committee is not convinced that Hydro's current plan is the best possible one for the Province. In the latter half of this chapter, the Committee will discuss its concerns in this area, and make specific recommendations.

SETTING NEW CAPACITY TARGETS

When the Committee first met last November, the system expansion plan to which Hydro was committed was called LRF 43P. That plan provided a 6 percent per annum increase in generating capacity from 1976 to 1985 that increased peak capacity from about 20,500Mw to about 34,500Mw

(Exhibit 24). This plan enabled Hydro to match the 7.2 percent forecast load growth with a slight drop in reliability levels towards the end of the ten-year period.

Using that plan as a point of reference, the Committee concluded that: circumstances have altered Hydro's traditional process for planning new generation, the Committee's recommendations above will result in new generation planning targets, and, Hydro's current plan will have to be reconciled with the new targets.

Recognizing the New Generation Planning Process

In June of last year, the Provincial Treasurer asked Hydro to see what could be done to moderate the rate of growth of its capital requirements. In response to that request, Hydro cut over $1 billion from its ten-year system expansion plan. Despite that cut, it was apparent from Hydro's explanation of its system planning process that the traditional approach was still being followed. This approach starts with a long-term forecast of peak demand as the basis for developing a generation plan to meet the demand with a high target level of reliability, balancing safety, environmental considerations and lowest long-term cost. The rates and capital borrowing are fallouts of the plan. The approach led the Committee, in its interim report, to conclude that it had to examine the system expansion plan in order to deal responsibly with the bulk power rate proposal.

It is the view of the Committee that Hydro must recognize that its traditional planning process has become obsolete. Current borrowing restrictions have rendered it inoperable this year, and the increasing cost of meeting future load growth makes it unnecessarily wasteful.

1. Hydro's current generation plan fails to meet its reliability targets. In January of this year, the Provincial Treasurer set limits of financial prudence on the amount that Hydro should borrow (Exhibit 25). These financial constraints caused Hydro to change drastically its plan for adding generation capacity. The changes affected 11 projects through cancellations and deferrals of one or two years (Exhibit 26), thereby reducing significantly the annual additions to generating capacity after 1979 (Exhibit 27). By 1985, the new plan calls for a reduction in generation capacity of some 4000Mw from the level of the earlier proposal (LRF 43P). As a result of the changes, it appeared that Hydro was running substantially

short of the capacity needed to maintain its target levels of reliability (Exhibit 28). When Hydro presented its updated load forecast to the Committee later in the session, it was apparent that, while the new load forecast appeared to reduce the shortfall in reserve margins, a shortfall still existed after 1980, becoming substantial by 1985 (Exhibit 29). Thus, possibly for the first time in its peacetime history, Hydro had a plan for adding generation that deliberately fell short of meeting the forecast load at target levels of reliability.

2. Increasing cost of providing electrical generation requires a process change. For many years, Ontario with its abundant hydraulic generation resources enjoyed the benefits of electric power that not only was cheap by North American standards, but also featured constant or declining annual rates. In that context, it made eminent sense for Hydro to supply all the power demanded - and even to encourage its growing use. As the Province ran short of economically developable new hydraulic potential, the new coal-fired capacity that was more expensive began, after several years, to force Hydro's rates to rise. However, the increases were moderate, and occasioned no real concern. Now, however, the situation has changed. During the last several years, Ontario Hydro has switched from a predominantly hydraulic system to a predominantly thermal system. The increased cost of thermal generation (Exhibit 30) will create a need for constant rate increases while this transition continues.

The principal thermal energy choices - nuclear and fossil fuels - each carry associated cost problems. The nuclear choice requires a commitment to a new and as yet only partially proven technology. To date, the North American nuclear experience has been one of capital costs exceeding forecast and reliability levels being below forecast. Ontario Hydro's program is still in its very early stages, but it appears to be far from free of the same problems.

The fossil choice carries other economic risks. Since 1973, coal prices have risen rapidly along with crude oil prices. There is some concern about the security of Ontario's long-term supply of Appalachian coal, and the development of Western Canadian coal has proved to be a long and expensive process. Residual oil is forecast to continue to be more expensive than coal on an equivalent BTU basis.

Thus, even if capital becomes available, new generation is going to be expensive and economically risky. In the view of this Committee, these factors - capital limitations and increasingly costly generation - demand a careful rethinking of Hydro's planning process.

§ Instead of simply meeting the forecast load with new generation capacity, Hydro should be determining the best way of meeting the Province's electric energy needs while encouraging reductions in the total peak demand.

§ Instead of setting a reliability target based upon an arbitrary industry standard of nearly absolute reliability at the generating level, Hydro should attempt to balance the cost of outages against the cost of reserve capacity.

§ Instead of considering the financial requirements - rate revenue and borrowing needs - as fallouts of the system expansion plan, Hydro should consider them as integral inputs that may force adjustments to demand and reliability targets.

These changes are illustrated in Exhibit 31.

The Committee recommends that:

III-22 ONTARIO HYDRO CHANGE ITS PLANNING PROCESS TO EMPHASIZE MEETING ONTARIO'S ELECTRICAL ENERGY NEEDS AFTER IMPLEMENTATION OF CONSERVATION AND LOAD MANAGEMENT PROGRAMS, WITH THE MINIMUM AMOUNT OF NEW GENERATION THAT IS CONSISTENT WITH SOUND PLANNING.

Setting New Targets For Generation

When the Committee first examined Hydro's system expansion plan in November 1975, the plan - LRF 43P - was based on the 1975 load forecast and reliability targets. Actions by Ontario Hydro and recommendations made earlier in this report by the Committee set new targets for additions to generation capacity. Since the Committee has recommended that, for now, Hydro continue to use its reliability standard of a long-term average of one outage due to generation inadequacies every ten years, the Committee has used as its reference point the amount of generation reserve that exceeds or falls short of that target.

LRF 43P fell somewhat short of Hydro's reliability standards based on information available in January 1976 (Exhibit 32). In February, when Hydro presented its new generation plan, LRF 47, bringing the forecast into line with the Treasurer's financial constraints, the information then available showed a substantial shortfall (Exhibit 28). The effect of actions taken by Ontario Hydro and certain key Committee recommendation is to turn this apparent shortfall into an unnecessary surplus. These key recommendations illustrated in Exhibit 33 are:

1. Recommendation III-2: endorses the new Hydro load forecast that is below the long-term trend. The new load forecast reduces the apparent capacity shortfall by about 1400MW in 1985.

2. Recommendation III-14: endorses Hydro's conservation targets with the provision that these become a Government commitment. By extrapolating a steady but somewhat slower growth of the conservation potential from the 831Mw set by Hydro for 1983 to about 1370Mw by 1985, the apparent generation shortfall is again reduced to a level that comes close to meeting the planned requirement.

3. Recommendation III-18: sets load management targets for Hydro aimed at reducing the peak during the winter months, and thereby the need for new generation capacity. A load management target of a 1 percent peak reduction in 1976 followed by a further 1 percent per annum to 1985 accumulates to a total of about 2500Mw by 1985, turning the apparent shortfall into a large surplus throughout the entire decade.

4. Recommendation III-21: calls for assigning a value to the tie-lines that interconnect Ontario Hydro with its neighbouring utilities. Adding between 500Mw and 1000Mw to the generation reserve as a result of this recommendation brings the total surplus to a minimum of between 1350Mw and 2500Mw for every year of the decade.

The Provincial Treasurer cut Hydro's generation program because the Government concluded that the borrowing required to support that program and other provincial needs went beyond the prudent limits of debt creation for the Province. Although the Government eventually determined that the Province need not go to the market at this time, it did not lessen the financial constraints it placed on Hydro. The Committee has concluded that the planned expansion - affordable or not - is unnecessary.

The Committee recommends that:

III-23 ONTARIO HYDRO ACCEPT THE COMMITTEE'S EARLIER RECOMMENDATIONS AND FURTHER REDUCE ITS TARGETS FOR ADDING GENERATION IN THE NEXT TEN YEARS.

Reconciling the New Targets with Hydro's Current Plan

Hydro's current system expansion plan brings its borrowing requirements very nearly into line with the limits set by the Provincial Treasurer. The Committee considered carefully whether it might be prudent to carry on with the system expansion program as money is available, keeping the new load targets as a potential reserve against future capital restrictions. The Committee rejects this approach.

First, Hydro's current plan puts it right at the limits of the borrowing directive (Exhibit 34). Retaining the current program leaves Hydro with very little room to accommodate any problems in raising funds internally, meeting unexpected costs, or accommodating unforeseen capital cost overruns. Very preliminary information on the cost of accommodating capital restrictions through a last-minute deferral program indicates that deferrals are very expensive (Exhibit 35).

Second, the current expansion program and all the changes being made to it are stretching Hydro's planning capacity. Hydro was often unable to provide information to the Committee because of the strain on planning staffs of adjusting the current program to live within the fiscal targets. The Committee is strongly of the view that the new planning approaches and new techniques for meeting the Province's electric energy requirements are needed. This new direction will increase the work load and will call on all the time, attention and creativity of Hydro's best people. The Committee has observed the enormous work load of Hydro's senior management and their dedication to the Corporation. It will be counterproductive for them to juggle the current plan against a borrowing ceiling.

Finally, the Committee has noted on several occasions its concerns with the financial burden that the system expansion program is placing on current users. Although Hydro argues that the changes in the expansion program will produce only very small changes in the rate, the Committee believes that every advantage should be taken of opportunities to lower the rate, however small.

The Committee recommends that:

III-24 ONTARIO HYDRO DEVELOP A NEW GENERATION PLAN THAT BRINGS ITS PLANNED GENERATION ADDITIONS DOWN TO THE COMMITTEE'S TARGET LEVELS AT THE EARLIEST, ECONOMICALLY FEASIBLE TIME.

CONSIDERING ALTERNATIVE TECHNOLOGIES

Hydro's response to the Provincial Treasurer's directive to cut its borrowings was to retain the basic framework of its program, deferring major projects for one to two years. The Committee is very concerned that Hydro consider different technologies and approaches in developing a new generation plan. The new plan should attempt to support provincial energy needs, consider alternative technologies, and reconsider the "nuclear cornerstone" strategy.

Supporting Provincial Energy Needs

The recent federal energy strategy appears to have accepted that Canada has, and will continue to have, an energy supply problem. In such a situation, Ontario, which imports most of its energy from other provinces or countries, is clearly vulnerable, especially since the Province has a large industrial base that requires abundant supplies of energy. Both the federal and provincial energy ministries seem to have accepted that shortages of oil and gas will lead to increasing reliance on coal and uranium. Further, coal is more conveniently utilized and uranium can only be utilized as electricity. Yet very little attention has been paid to the vast quantities of energy that are lost and pollute the environment as byproduct waste heat.

The Committee is concerned that so little is being done to generate more electricity from industrial waste heat. The Committee is equally concerned that Hydro's current plans for the next 20 years contain only a limited provision for capturing some of the waste heat from its thermal generating stations for district or industrial heating. The Committee is unaware of any plan by Hydro to sell steam from its generating stations to adjacent industry. (The only two provisions that were drawn to the Committee's attention are: the integration of the Bruce heavy water plants with the nuclear generating stations, which shows that industrial potential exists; and, the study of district heating for North Pickering.)

The Committee's discussion with Hydro on this topic always reverted to the organizational problems of bringing suppliers and users together. The Committee acknowledges the complexities of overlapping jurisdictions. Federal Government policy does not accord the production of electrical energy from waste heat the same tax benefits as the production of new oil or gas energy. The Province would have to act to assemble industrial parks or new communities around approved Ontario Hydro sites. Municipalities would have to ensure that user densities of district heating installations are economic. The complexities only increase the urgency of getting started soon. If Hydro's new generating stations are not designed to utilize waste heat, the cost of modifying them later will be very high.

The Committee recommends that:

III-25 THE ONTARIO GOVERNMENT ACCEPT RESPONSIBILITY FOR LAUNCHING AND DIRECTING A PROGRAM THAT WILL ENSURE ONTARIO IS MAKING OPTIMAL USE OF BY-PRODUCT HEAT ENERGIES FROM THERMAL ELECTRIC GENERATING STATIONS.

Considering Alternative Technologies

The Committee explored several other possibilities with Hydro, which it is convinced have not been given appropriate consideration by the utility. They fall into several areas: taking advantage of small supplementary electrical energy sources, tapping the potential of solar energy, and taking advantage of the hydraulic potential of the rivers flowing into James Bay.

The small, supplementary electrical energy sources not being considered by Hydro are small hydraulic sites. Over the past 25 years, Hydro has abandoned a number of small hydraulic sites as too small and expensive to operate (Exhibit 36). Times have changed, alternative energy sources having become scarce and more expensive. Hydro should re-examine these sites with a view to either reopening them or offering them at reasonable terms to private users to ensure that the potential from these sites is not wasted.

Several witnesses discussed the solar energy potential in Ontario. The general conclusion is that, at this time, solar energy is not economically feasible for electric generation or for supplying the total heating needs of a residence. However, solar heat may be feasible as a supplementary source of heating energy. It may be particularly useful in conjunction with heat-storage equipment that could play an important role in Hydro's load management program. It may be that in conjunction with the load management program, it will be more economical for Hydro to supply and rent solar units to its customers than to build new generation. At the least, solar energy is another alternative that must be seriously considered.

The Committee recommends that:

III-26: ONTARIO HYDRO, IN DEVELOPING A NEW GENERATION PLAN, ENSURE THAT SMALL HYDRAULIC SITES ARE USED WHEREVER FEASIBLE, AND THAT THE POTENTIAL OF SOLAR ENERGY IS APPROPRIATELY TAPPED.

Finally, the Committee is concerned about Ontario Hydro's apparent failure to give serious consideration to the hydro-electric potential of the watershed flowing into James Bay - both the systems in Ontario and those in Quebec. The Committee is aware of the difficulties in getting electrical energy from either area. In Northern Ontario, the concerns of the native peoples and environmental problems will have to be dealt with before any development can take place. This increases the urgency for starting studies and inquiries now. And, if Ontario is to gain any benefit from the Quebec Baie James potential, the Government of Ontario will have to initiate negotiations with the Government of Quebec. All the more reason for setting out the parameters of an acceptable arrangement and doing preliminary calculations of the economics of such a venture. It is quite possible that the whole development of the James Bay watershed should be considered in the context of national electric energy policy, which would require the involvement of the Government of Canada. The Committee found Hydro's reluctance to give serious consideration to this potential frustrating and perplexing.

The Committee recommends that:

III-27 THE ONTARIO GOVERNMENT ACCEPT RESPONSIBILITY NOW FOR TAKING ALL NECESSARY ACTIONS TO ENSURE THAT ONTARIO RECEIVE THE MAXIMUM REASONABLE BENEFIT FROM THE HYDRO-ELECTRIC POTENTIAL OF THE JAMES BAY WATERSHED.

Reconsidering the Nuclear Cornerstone

Several years ago Ontario Hydro, with the agreement and support of the Government of Ontario, developed a generation strategy to meet the Province's energy needs in the absence of large-scale economic, hydraulic potential. The key element of the strategy was a commitment to the CANDU nuclear-powered generator. In the next ten years, Ontario will see the maturing of that strategy. After completion of the fossil thermal stations at Nanticoke and Lennox, four of the five major new stations, representing about 11,500Mw of capacity, will be CANDU nuclear stations. The sole exception is the planned Wesleyville oil-fired station. Wesleyville will retain Hydro's position as a purchaser of a conservative fraction of the low distillates from Eastern Canadian oil refineries.

The Committee is concerned that: there has been so little public involvement in this major nuclear commitment; there are several elements to the choice beyond the nuclear commitment; and, there are many unanswered questions about the program.

The Committee expressed its concern, in questioning Hydro about the nuclear strategic choice, that it has never been subject to careful public scrutiny. Task Force Hydro, for example, examined the nuclear program only after accepting Hydro's commitment to nuclear generation. The Porter Commission is examining Hydro's planning - but after the nuclear commitment has matured.

Secondly, Hydro's particular strategy for adopting nuclear energy includes:

§ Large, multi-unit plants that increase the need for reserve capacity and the risk of substantial failures

§ Remote, Great Lakes locations that reduce the ability to utilize waste heat or to steer population movements

§ Ever-increasing unit sizes that commit Hydro to constantly facing the challenge of building and operating new plants with new technology.

Finally, vital questions about the economics, reliability and safety of the nuclear program remain unanswered at this time:

§ Economics: The Committee was made fully aware that the basic economic characteristic of a nuclear plant is high capital cost combined with low operating cost - the latter being primarily attributable to the relatively low cost of Ontario uranium. However, the overall balance of these economic factors was never adequately presented. Hydro presented some theoretical calculations comparing a fossil station to a nuclear station coming into service in 1985. These calculations showed that at moderate (40 percent to 60 percent) capacity factors (Exhibit 37), there is little to choose between generation types, and that the cumulative advantage of the nuclear program is not apparent until 1993 - more than 15 years after expenditures on the plant begin. Given this narrow economic advantage, the questions the become critical are: What are the assumptions being used in the calculations? Is it worthwhile to pay higher rates today for benefits that lie so far in the future? Should Hydro not respond to the concern expressed by the Ontario Energy Board in its 1974 review that its economic evaluation methodology is inadequate?

§ Reliability: The nuclear commitment is by its nature a commitment to a new technology - and one that is just being proven. It is no surprise that unexpected developments have occurred. In the case of the first Pickering station, a year of unanticipated, exceptionally good performance was followed by a year of unanticipated problems. The Committee noted that Hydro is projecting the reliability levels for future plants will stabilize after four years at levels that are roughly comparable to those for fossil stations. The unanwered questions are: on what basis is Hydro projecting reliability levels that appear to be above the experience of other jurisdictions? How far can reliabilty deteriorate before nuclear plants cease to be the best alternative? Does it make sense to move to larger units before the operating experience of overall units is stabilized?

§ Safety: The issue of nuclear safety has been actively debated in many other jurisdictions. The Committee had a very short time to probe this area, and its questions fell into a limited range, namely: Who is setting the safety standards? What external agency is monitoring Hydro's compliance? Could the system eventually be plutonium-based?

The Committee's concerns about the nuclear program do not fall easily into a specific recommendation. The Committee has noted that the Royal Commission on Electric Power Planning appears to be spending some time probing the unanswered questions about nuclear safety.

The Committee recommends that:

III-28 THE ONTARIO GOVERNMENT APPOINT A SELECT COMMITTEE AS THE APPROPRIATE PUBLIC FORUM TO EXAMINE HYDRO'S NUCLEAR COMMITMENT.

CHAPTER III-4

ENSURING ADEQUATE FOLLOW-UP

The Select Committee's recommendations to this point in the report set out much of the new public policy direction for Ontario Hydro. It is essential that these recommendations be seen not in isolation but as integral parts of the whole new direction. The report must be viewed in its entirety, as the new direction is a substantial redirection for both Ontario Hydro and the Government.

The new direction will also require a substantial change to the Government's approach to energy. The traditional arm's-length approach to Ontario Hydro is changed by the joint commitment to conservation and load management objectives. A more vigorous Government role in electric energy is set out - from increasing the extent of industrial electricity generation to working towards energy efficiency standards for appliances. And, there will be a new urgency to articulate an overall energy policy for the Province. The Committee expects that the Government, in formulating its energy policy, will follow the Committee's lead in taking immediate action before flexibility is lost, to build an economy that deals more realistically with the wise and efficient use of our energy resources.

The new direction will cause changes in Hydro's planning objectives, relationships and internal processes. Hydro has traditionally planned to meet forecast demand with new generation; the Committee has suggested that Hydro plan to accommodate the Province's future energy needs with a variety of conservation and load management approaches before turning to new generation. Hydro has traditionally set reliability standards based on conservative and arbitrary industry practices; the Committee has suggested that Hydro develop a measure of reliability that relates to customer needs, and reduce its overall reliability level. Hydro has traditionally planned a generation program aimed, generally, at lowest long-term cost of producing electricity; the Committee has questioned whether that goal should not be combined with a broader consideration for the Province's overall energy situation. The new direction will change Hydro's relationship to the public. Hydro will no longer be concerned only with "good public utility practices," but will give greater consideration to the overall needs of the Province. The new direction will also cause substantial changes in Hydro's internal processes. The planning process, for example, will change from a sequence of relatively independent steps to an iterative, highly interactive process.

In addition to these broad changes, the Committee is aware that the new planning objectives will require specific, concrete action. Compared to the new objectives, Hydro's current system expansion plan will produce a substantial excess of generating capacity in each of the next ten years, as shown in Exhibit 34. The Committee has already recommended that the system expansion plan be reduced to eliminate as much of the surplus as is economically feasible. It has also already recommended the development of a new system expansion plan that includes specific consideration of alternatives and that all aspects of the "nuclear cornerstone" strategy be reconsidered immediately, by a Select Committee of the Legislature. It is possible that a new system expansion plan, meeting the Committee's recommendations, would include the cancellation (or long-term deferral) of one of the generating stations on which work is currently proceeding.

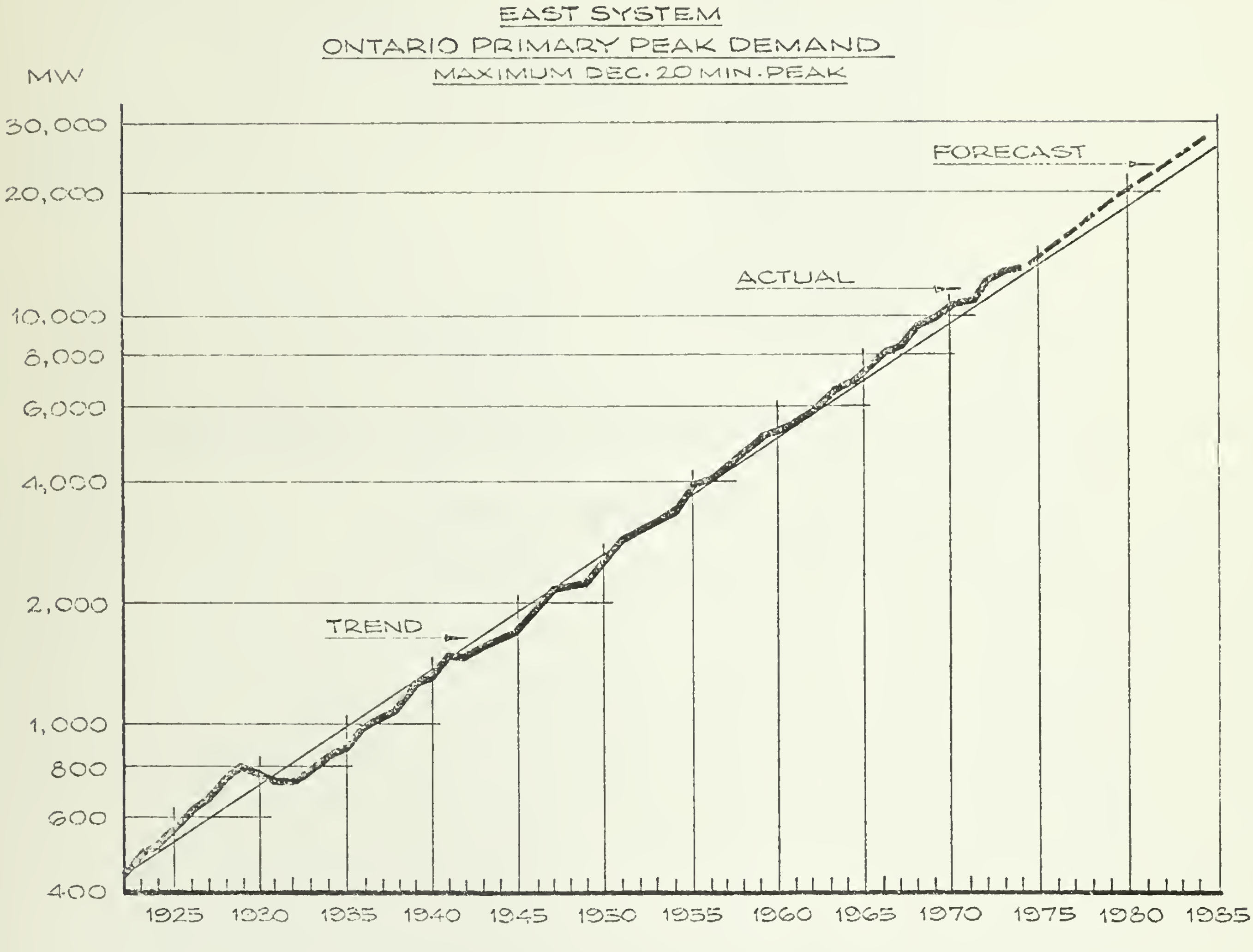
It is of fundamental importance that until the redirection becomes clearly established Hydro policy, steps taken by Ontario Hydro to implement the thrust of the report be monitored periodically in an organized manner. As it is critical that the new system expansion plan and Hydro's broad response to the redirection be subject to review, the Committee has given careful consideration to how such a follow-up should be carried out. The Committee recognizes that the new system expansion plan and the speed and scope with which Hydro implements the Committee's recommendations will be concrete indicators of the extent to which Hydro is able or willing to deal with the far-reaching changes in direction that flow from the report.

The Committee recommends that:

III-29 (i) THE ONTARIO GOVERNMENT ACCEPT THE THRUST OF THE COMMITTEE'S REPORT AS GOVERNMENT POLICY AND INSTRUCT HYDRO TO BEGIN IMMEDIATELY TO IMPLEMENT THE COMMITTEE'S RECOMMENDATIONS. (ii) THE MINISTRY OF ENERGY COORDINATE THE GOVERNMENT POLICY AND MONITOR HYDRO'S IMPLEMENTATION ON AN ONGOING BASIS.
(iii) THE ONTARIO GOVERNMENT APPOINT A SELECT COMMITTEE OF THE LEGISLATURE TO WHOM HYDRO WILL REPORT ON A PERIODIC BASIS ON ITS NEW SYSTEM EXPANSION PLAN AND ITS IMPLEMENTATION ON THE COMMITTEE'S RECOMMENDATIONS COMMENCING IN THE SPRING OF 1977.

Exhibit III-1

THE GROWTH IN DEMAND HAS REMAINED REMARKABLY CLOSE TO A LONG TERM AVERAGE ANNUAL GROWTH RATE OF 6.8%

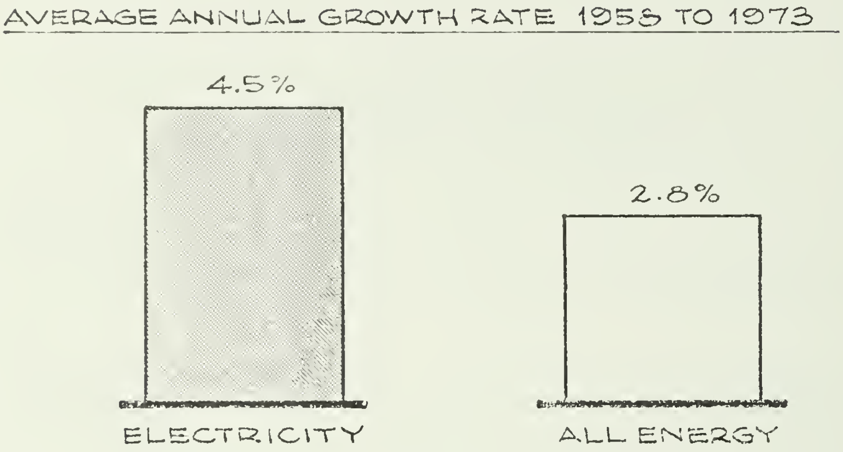


- 1922-29 - INCLUDE THE DOMINION POWER TRANSMISSION CO. BOUGHT IN 1930.
- 1933-45 - INCLUDE CONVERSION OF AMERICAN CYANAMID SECONDARY TO PRIMARY, WAR AND FIRM EXPORT EXCLUDED.
- 1947, 48, 49, AND 51 - INCLUDE ESTIMATED EFFECT OF RESTRICTIONS.

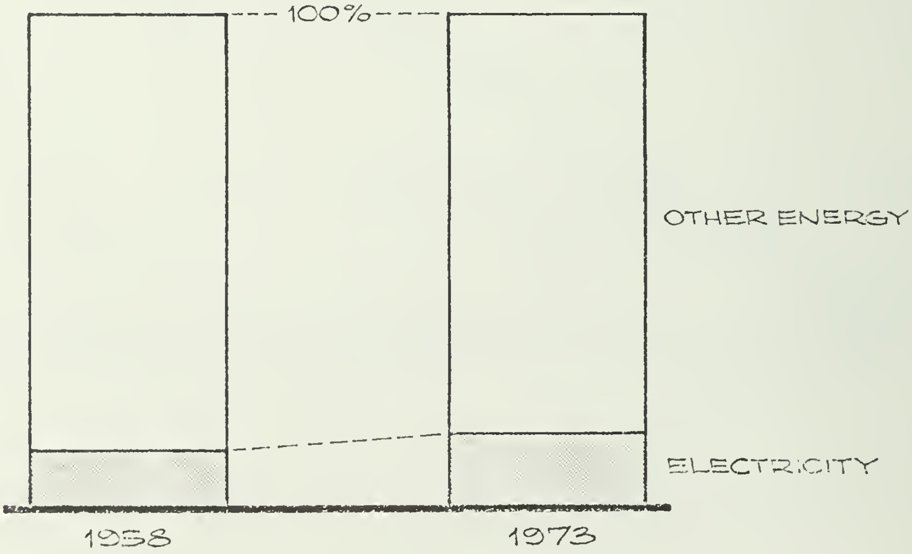
SOURCE - BASED ON ONTARIO HYDRO LOAD AND CAPACITY REPORT 750616.

Exhibit III-2

THE PER CAPITA CONSUMPTION OF ELECTRICITY IN ONTARIO HAS GROWN ALMOST TWICE AS FAST AS OVERALL ENERGY CONSUMPTION . . .



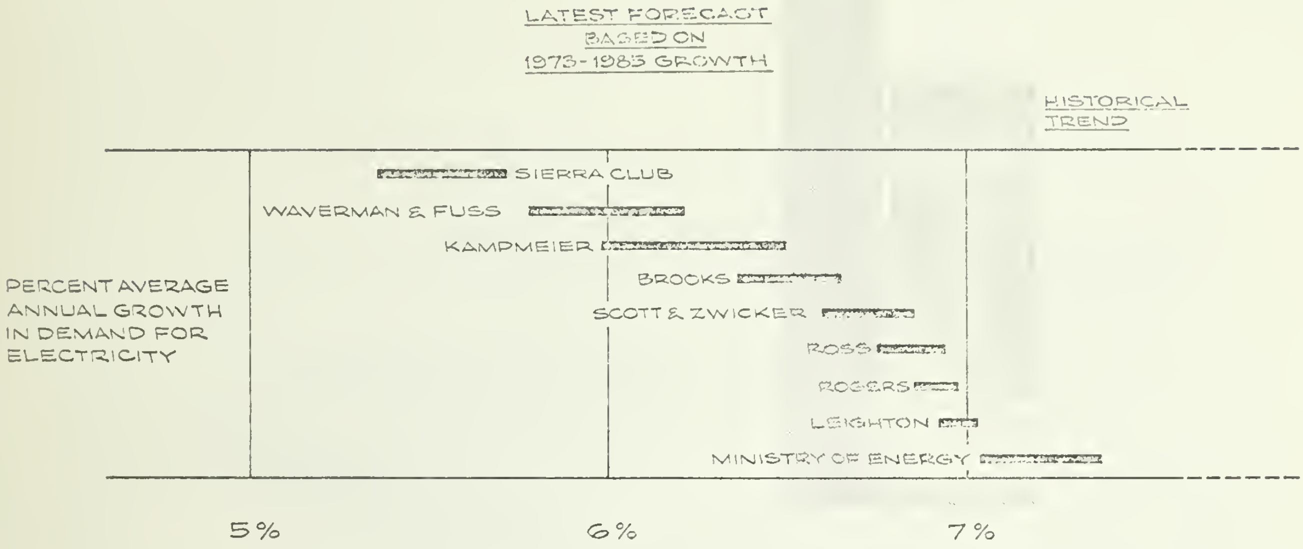
. . . INCREASING ELECTRICITY'S SHARE OF TOTAL ENERGY CONSUMPTION FROM 11% TO OVER 14%



SOURCE - ONTARIO HYDRO EXHIBIT B-8

Exhibit III-3

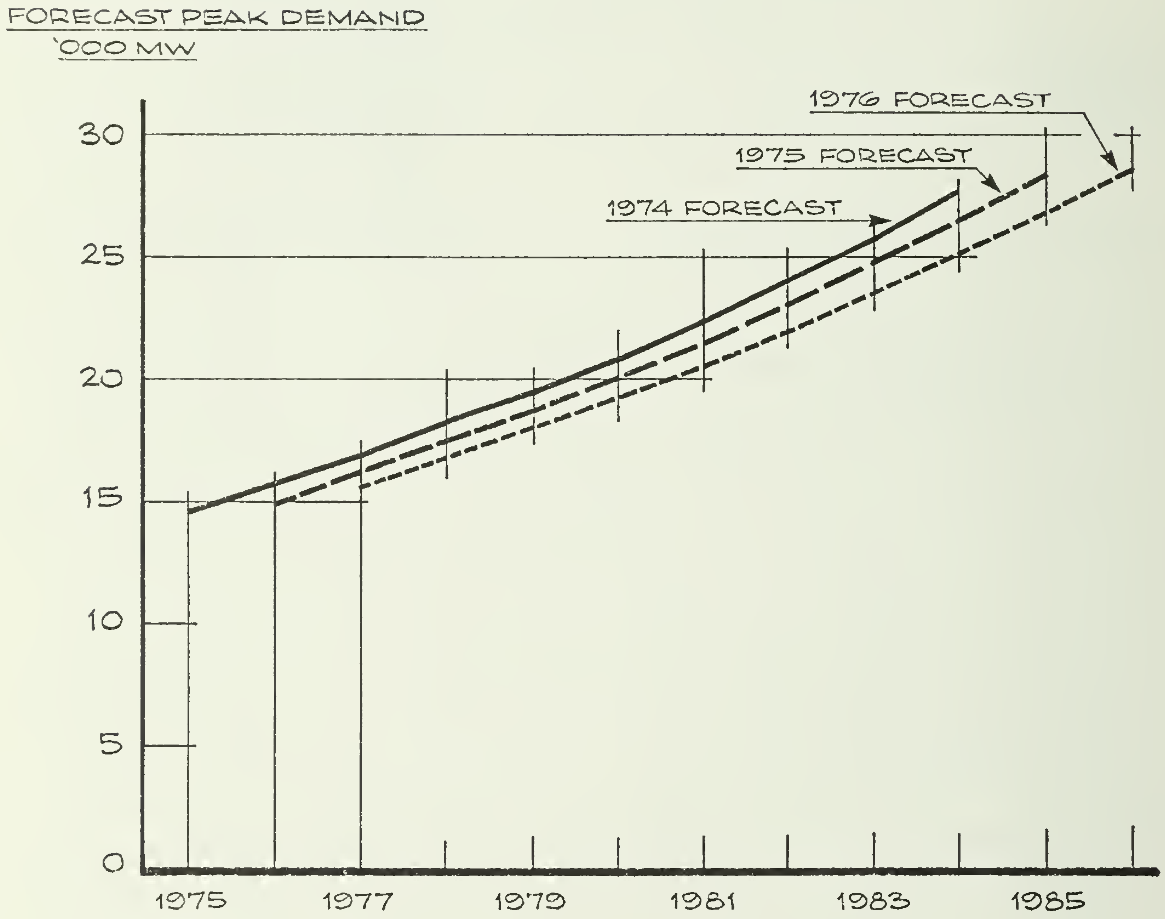
ONTARIO HYDRO'S LATEST FORECAST SEEMS TO FALL WITHIN THE CONSENSUS OF OUR EXPERT WITNESSES



* WITH LIBERAL INTERPRETATION OF NON-QUANTIFIED STATEMENTS

Exhibit III-4

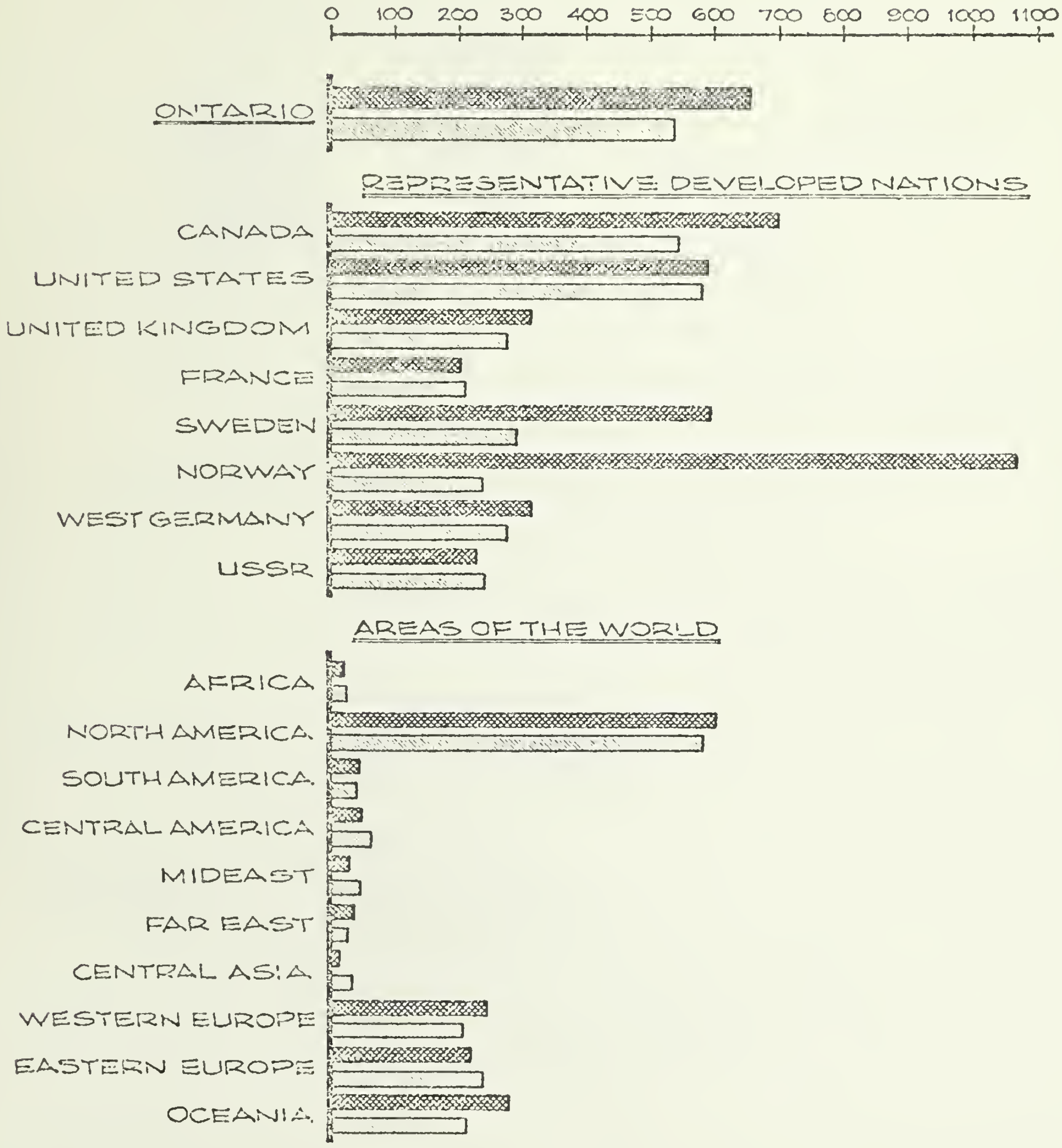
HYDRO'S FORECASTS HAVE COME DOWN IN EACH OF THE PAST TWO YEARS



SOURCE - STAFF ANALYSIS OF HYDRO MATERIAL

Exhibit III-5

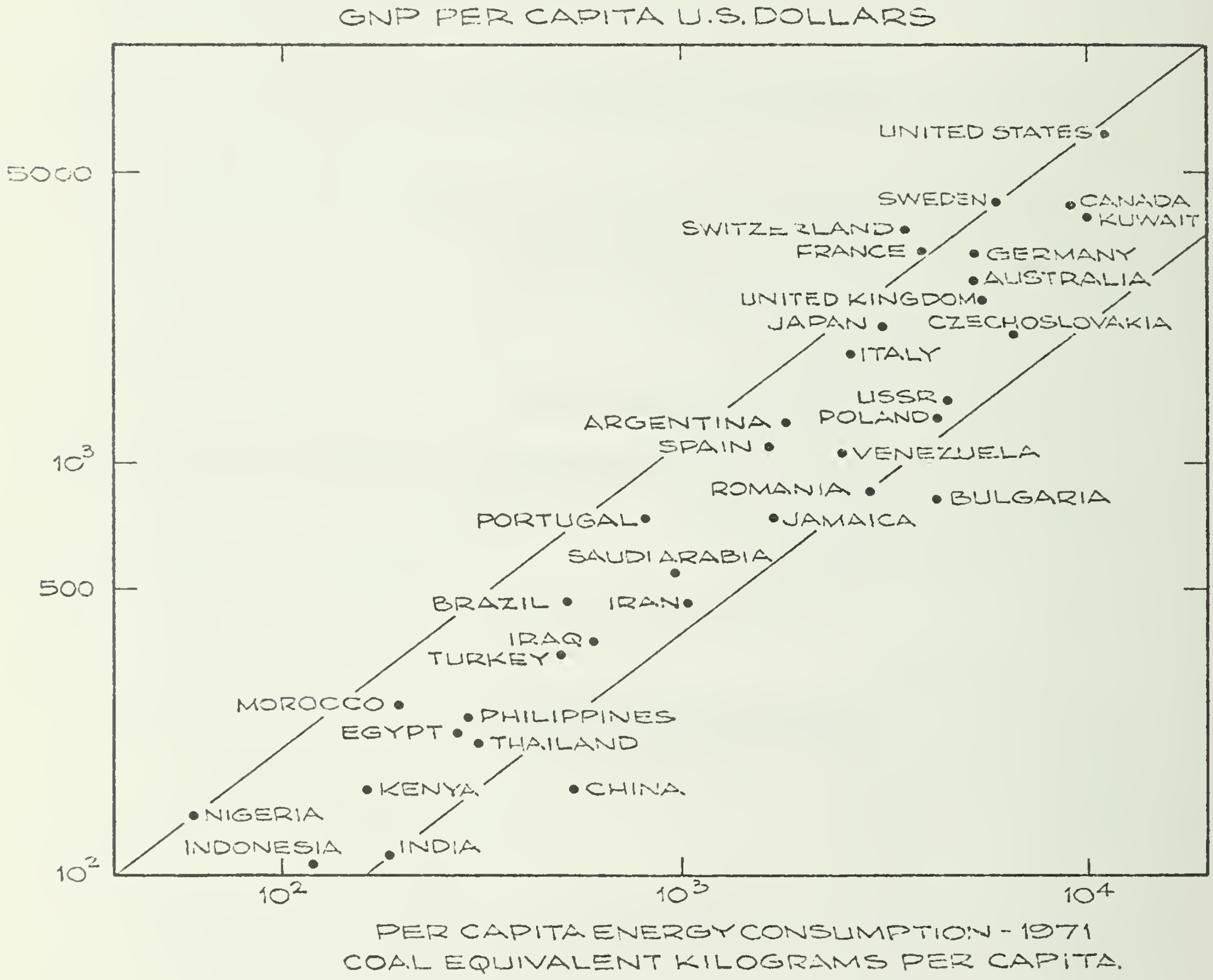
ONTARIO CONSUMES A LARGE AMOUNT OF ENERGY COMPARED TO THE REST OF THE WORLD



▨ ELECTRICITY ☐ ENERGY CONSUMPTION

Exhibit III-6

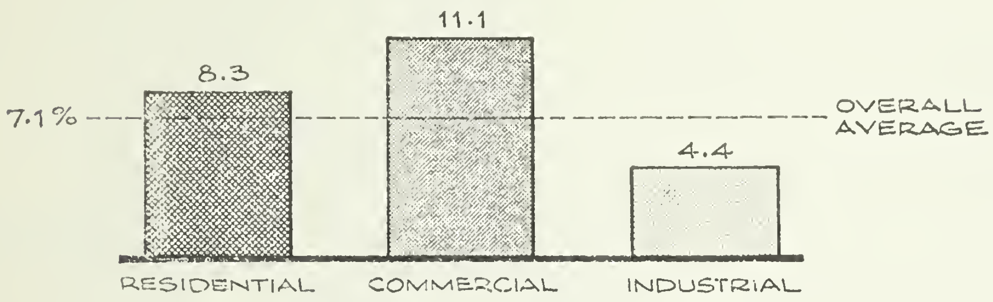
WHILE THERE HAS BEEN A GENERAL RELATIONSHIP BETWEEN GNP AND ENERGY CONSUMPTION, THERE APPEARS TO BE PLENTY OF SCOPE FOR REDUCING ENERGY WITHOUT CUTTING BACK GNP



SOURCE - UNITED NATIONS ENVIRONMENT PROGRAM

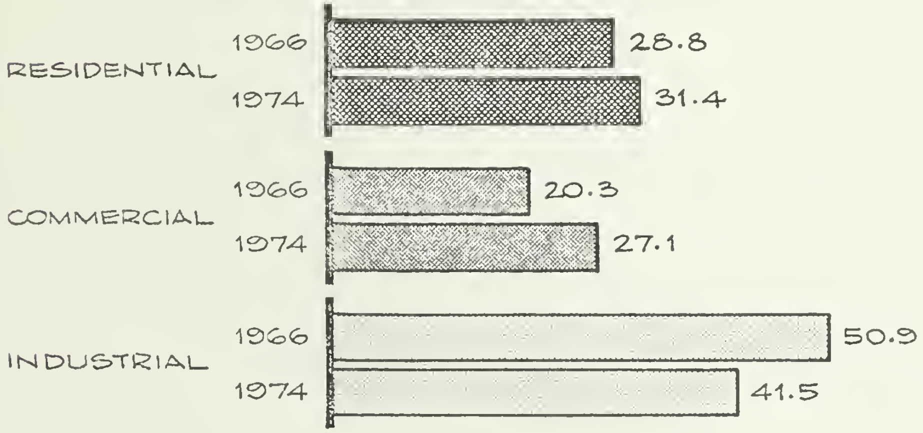
THE FASTER GROWTH RATE IN COMMERCIAL AND RESIDENTIAL CONSUMPTION . . .

PERCENT AVERAGE ANNUAL GROWTH RATE 1966-1974



. . . HAS SUBSTANTIALLY INCREASED THEIR RELATIVE SHARES OF TOTAL ELECTRICITY CONSUMPTION

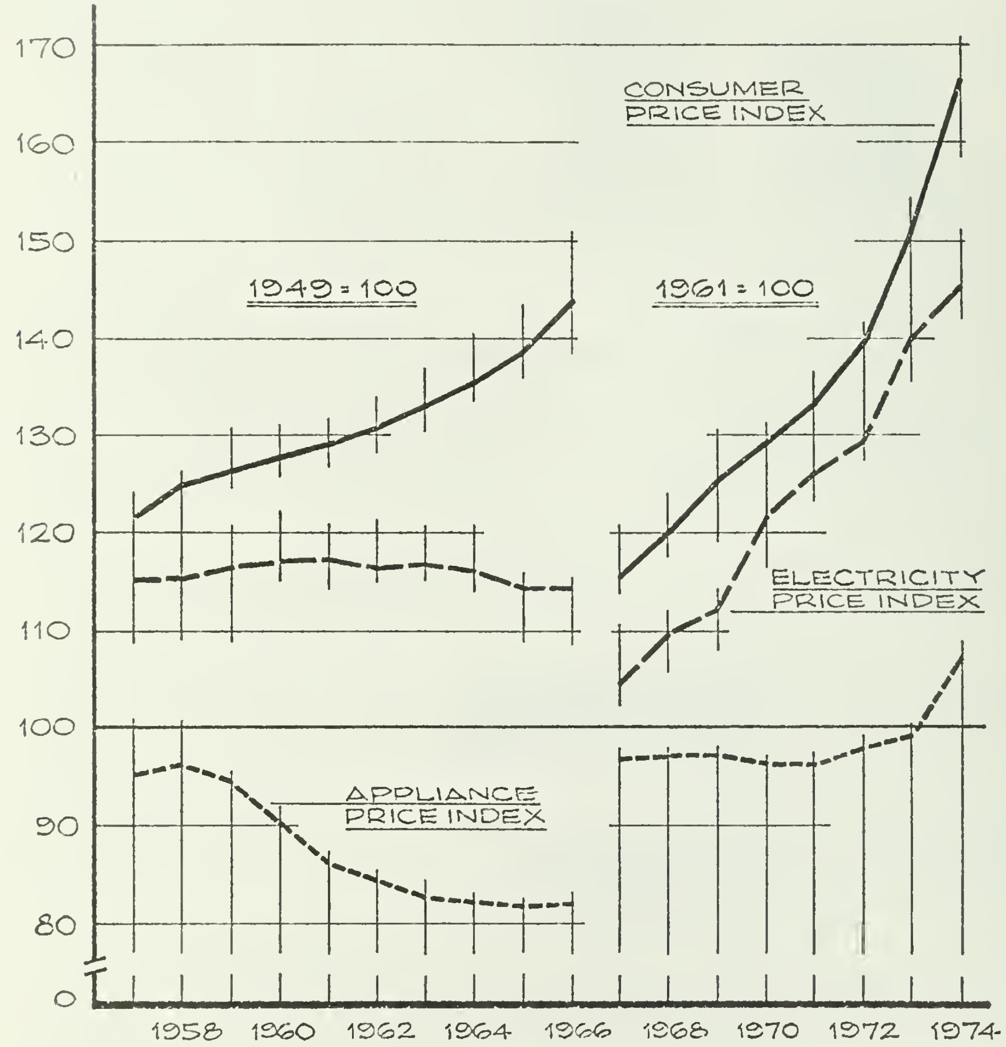
PERCENT SHARE OF TOTAL ELECTRICITY CONSUMPTION



SOURCE - ONTARIO HYDRO EXHIBIT B-8

Exhibit III-8

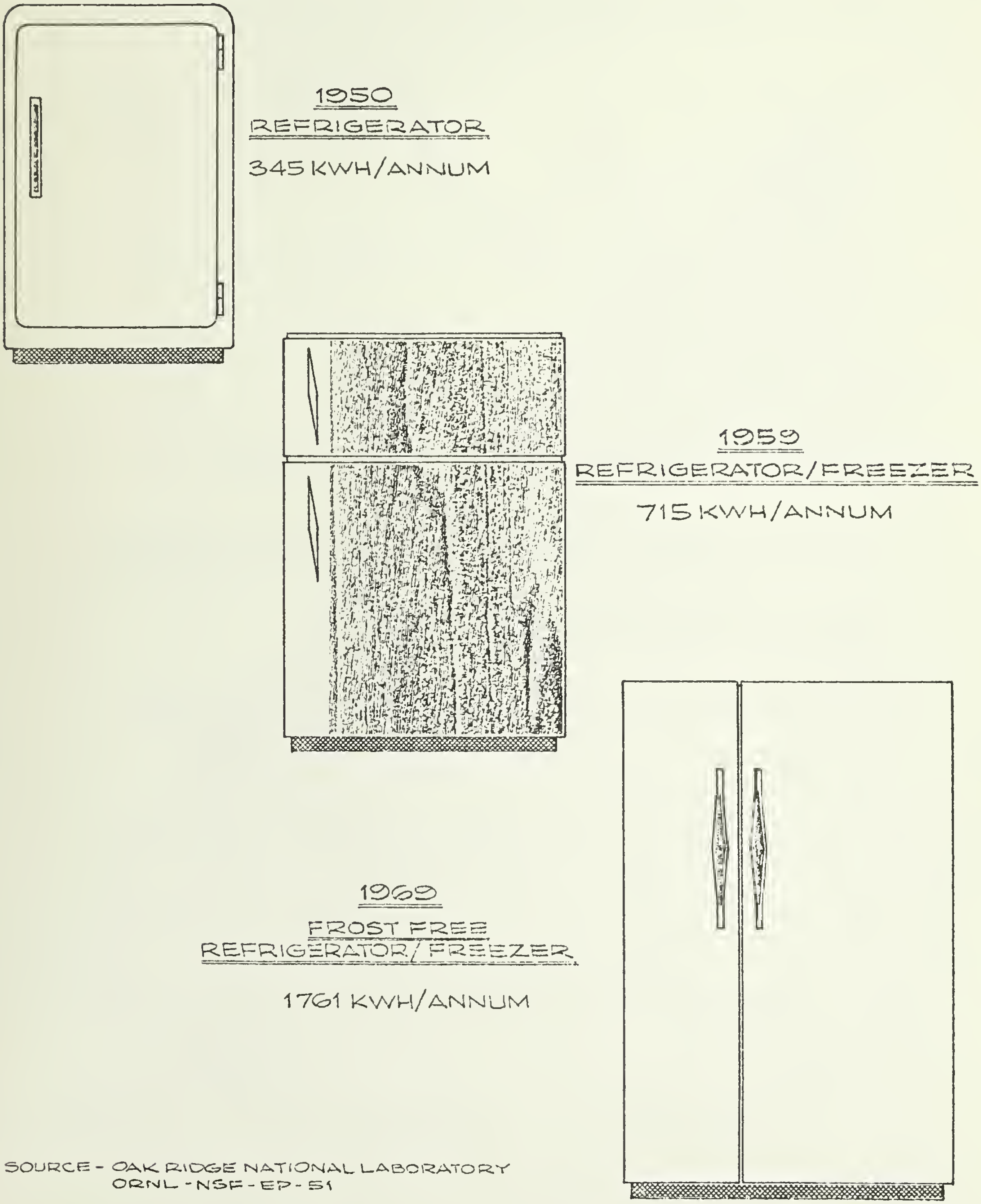
ELECTRICITY APPLIANCES HAVE BEEN CHEAPER THAN OTHER CONSUMER GOODS AND SERVICES



SOURCES - SIERRA CLUB OF ONTARIO.
PRELIMINARY SUBMISSION TO ROYAL COMMISSION INTO ELECTRIC POWER PLANNING, NOVEMBER 13, 1975

Exhibit III-9

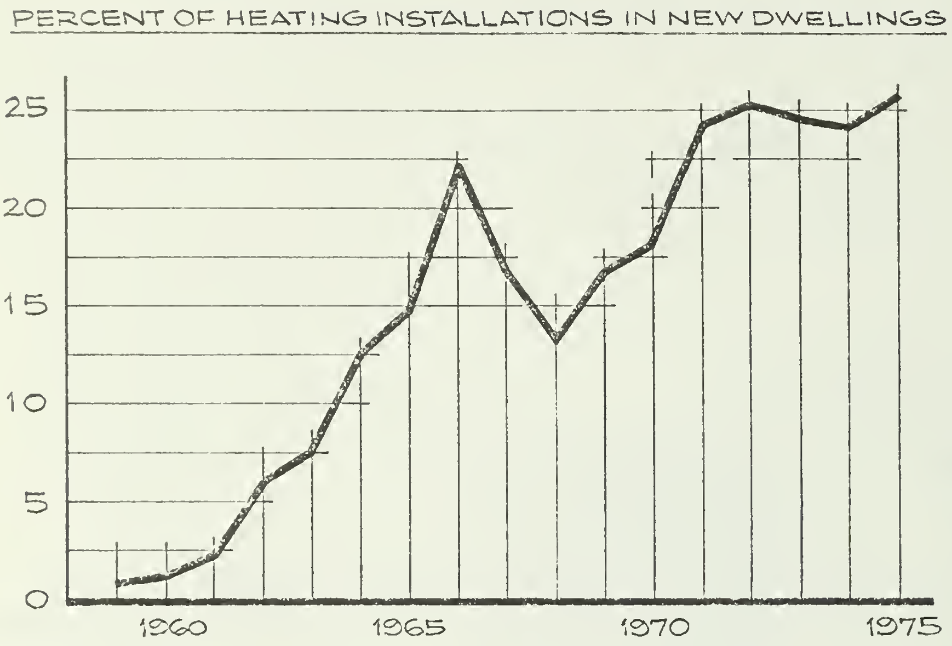
NEW FEATURES HAVE GREATLY INCREASED THE ELECTRIC CONSUMPTION OF THE REFRIGERATOR



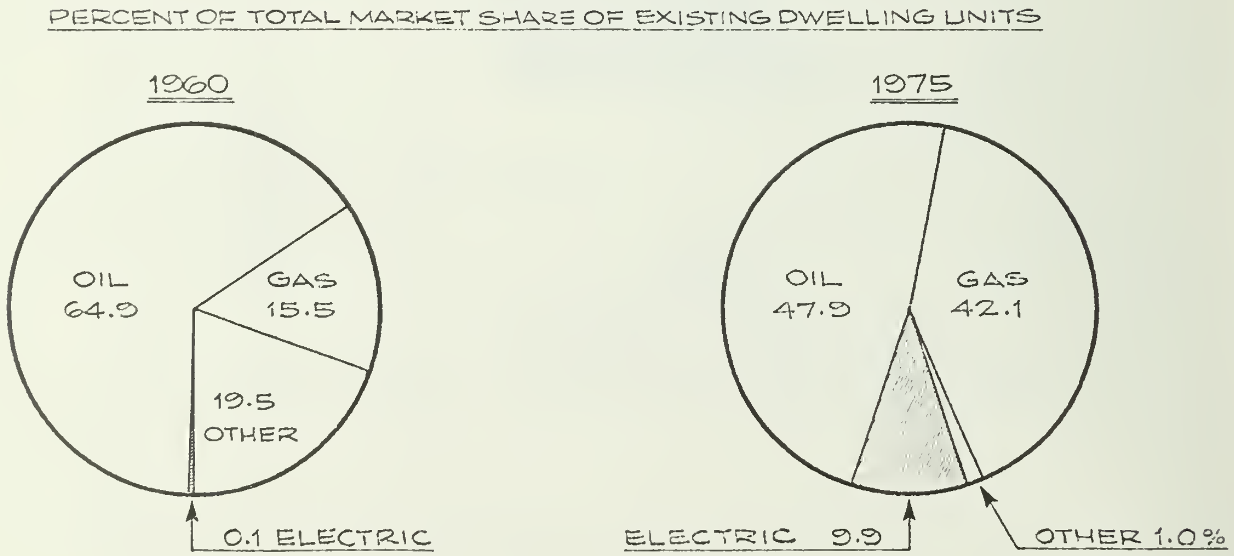
SOURCE - OAK RIDGE NATIONAL LABORATORY
ORNL - NSF - EP - 51

Exhibit III-10

THE ELECTRIC SPACE HEATING SHARE OF NEW RESIDENTIAL CONSTRUCTION HAS STABILIZED AT AROUND 25% . . .



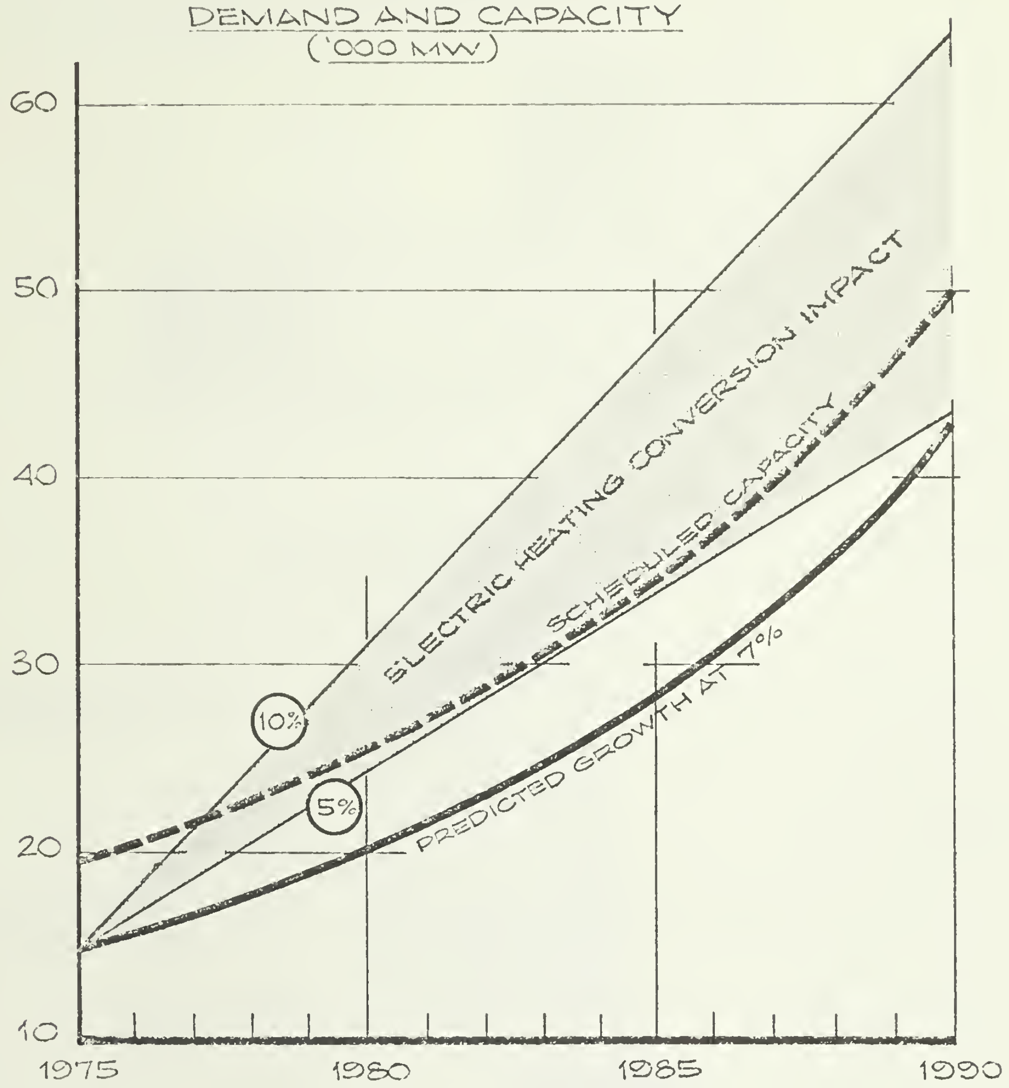
. . . SO THAT ELECTRICITY NOW CONTRIBUTES ABOUT 10% OF ONTARIO'S HOME HEATING NEEDS



SOURCE - ONTARIO HYDRO EXHIBIT 3-

Exhibit III-11

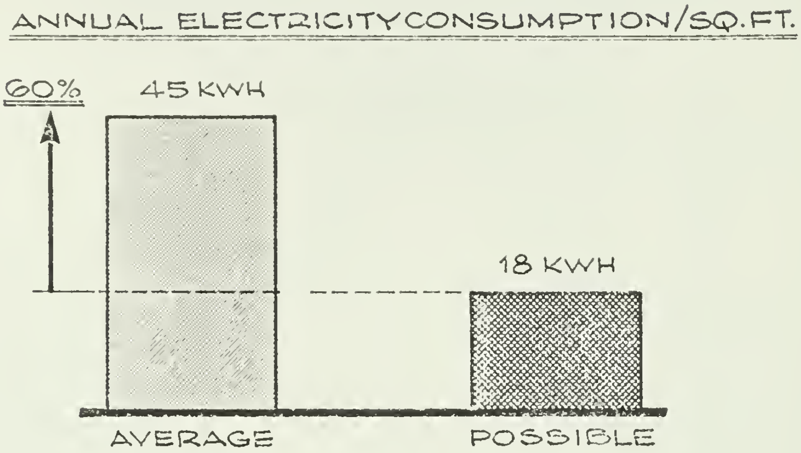
IF OWNERS OF OLDER HOMES START TO CONVERT TO ELECTRICAL HEATING, THE ADDITIONAL DEMAND FOR ELECTRIC POWER COULD OVERWHELM GENERATION CAPACITY



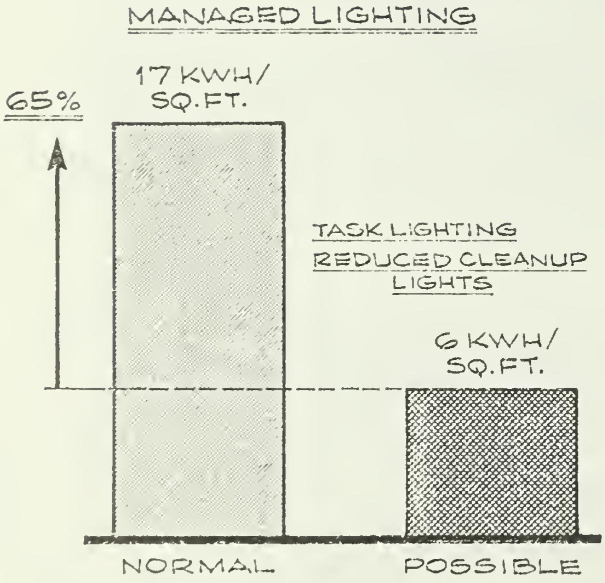
SOURCE - R.T. TAMBLYN, ENGINEERING INTERFACE LTD.

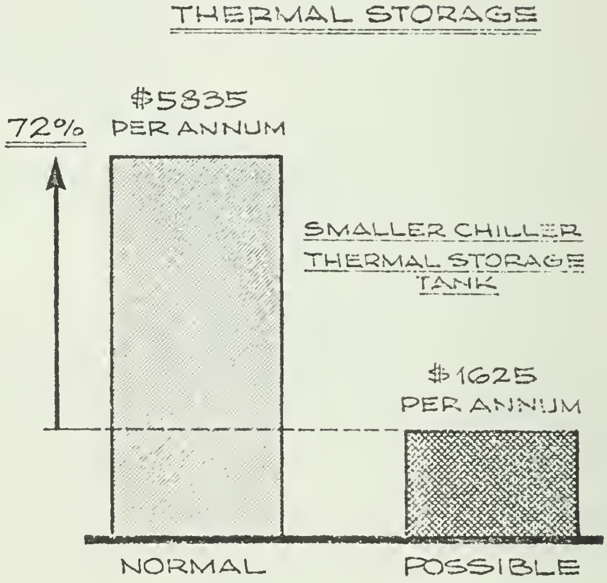
Exhibit III-12

EVIDENCE SHOWS THAT IT IS POSSIBLE TO REDUCE COMMERCIAL ENERGY USE SUBSTANTIALLY . . .



. . . THROUGH SUCH FEASIBLE SCHEMES AS:

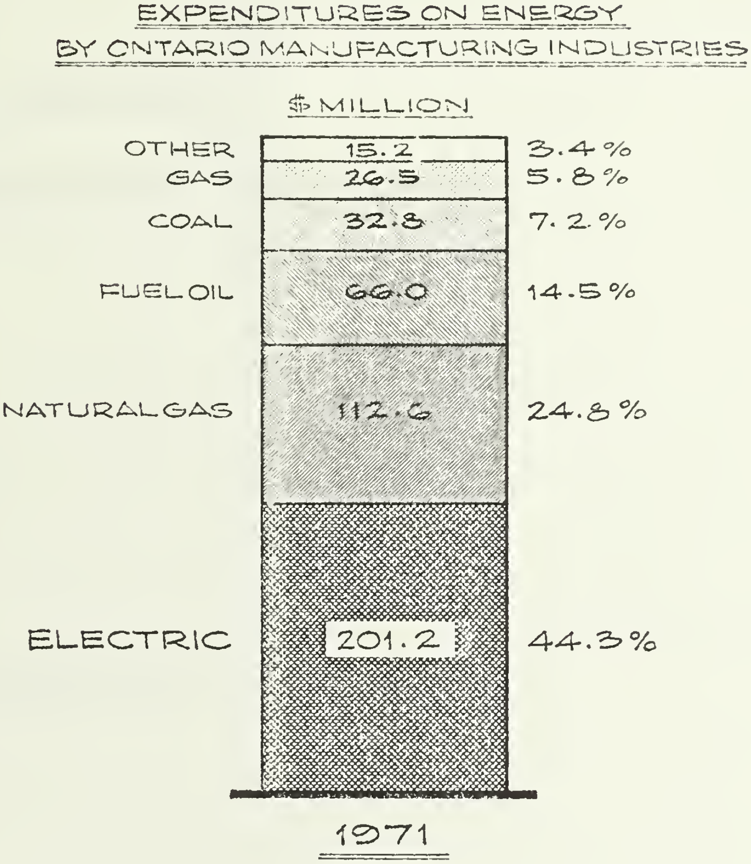




SOURCE - R.T. TAMBLYN, ENGINEERING INTERFACE LTD.

Exhibit III-13

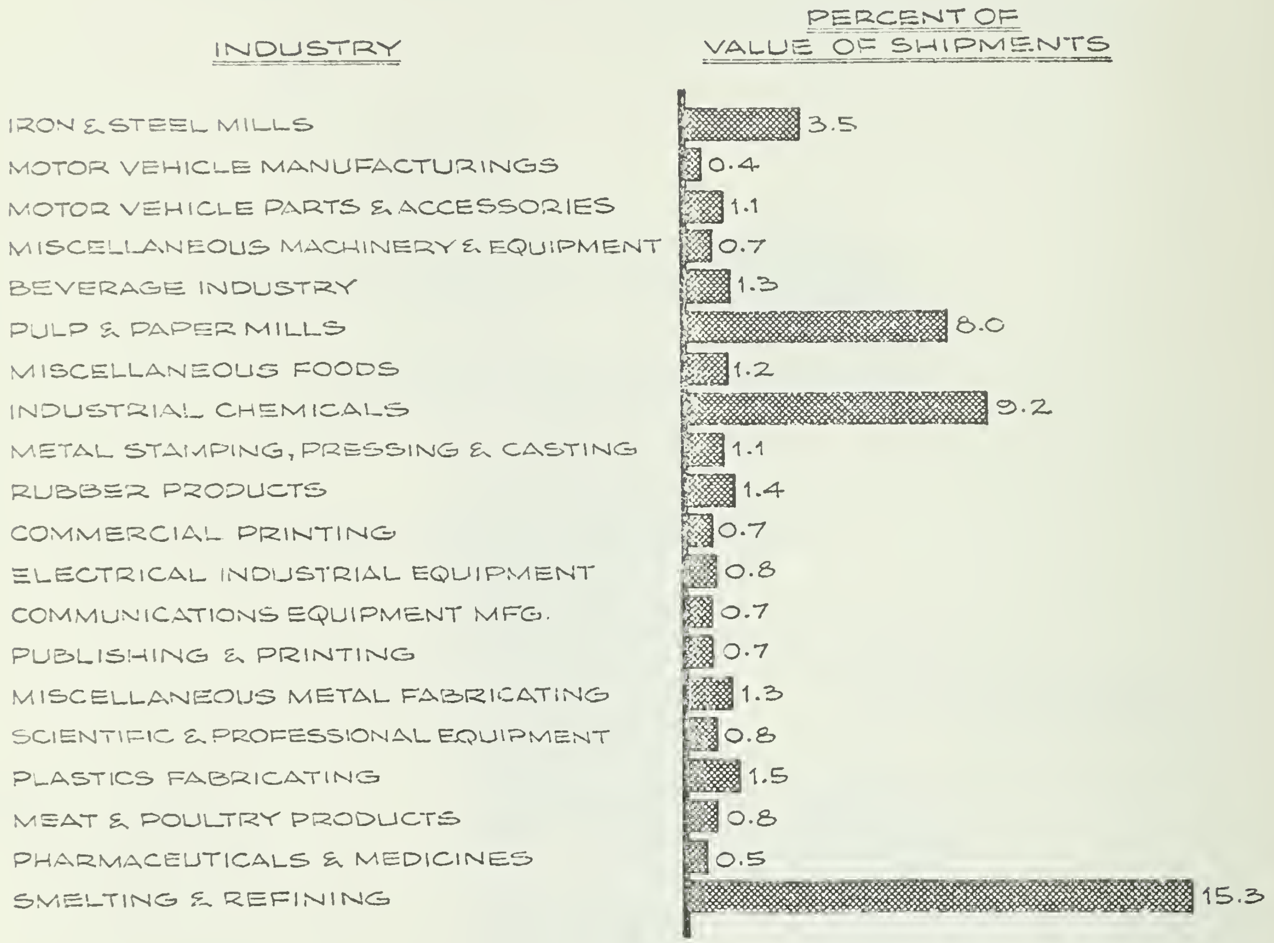
ELECTRICAL ENERGY IS THE DOMINANT FORM OF ENERGY USED BY INDUSTRY



SOURCE - ONTARIO STATISTICAL CENTRE

Exhibit III-14

ENERGY COSTS ARE TYPICALLY A SMALL PROPORTION OF INDUSTRY COST

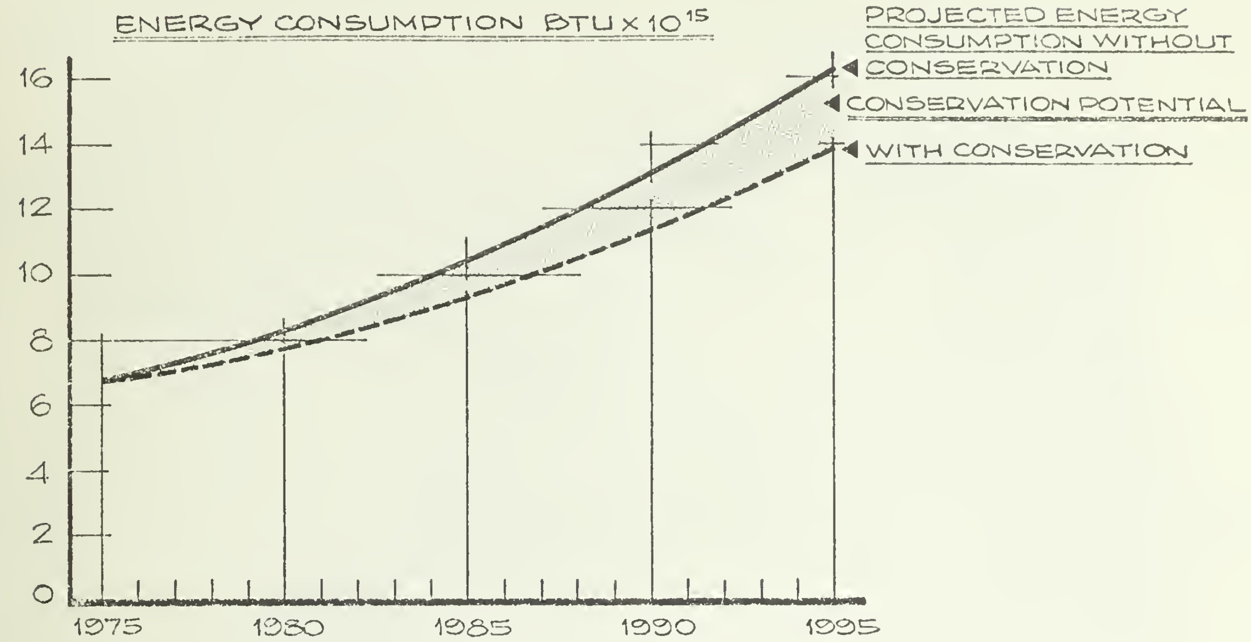


SOURCE - ONTARIO STATISTICAL CENTRE

Exhibit III-15

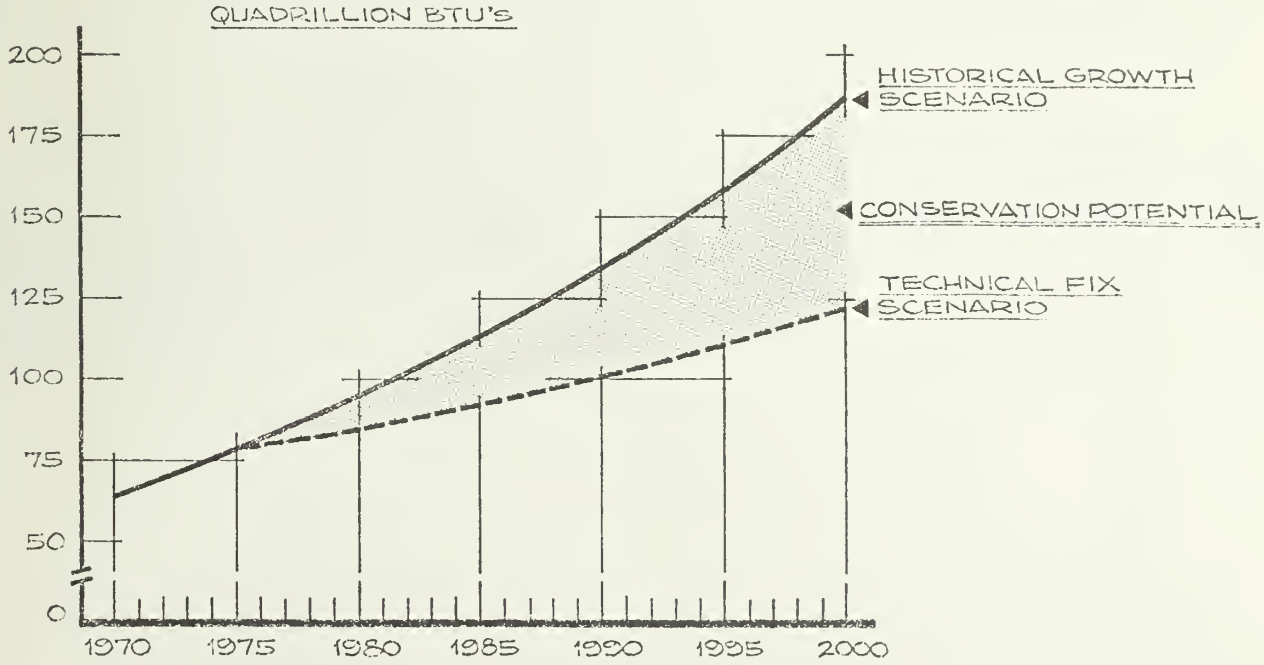
EXPERTS AGREE THAT CONSERVATION BUILDS SLOWLY

. . . AS IN THE SCIENCE COUCIL OF CANADA REPORT



SOURCE - SCIENCE COUNCIL OF CANADA, BACKGROUND STUDY #33, JULY, 1975

. . . OR IN THE LANDMARK REPORT FROM THE FORD FOUNDATION



SOURCE - ENERGY POLICY PROJECT OF THE FORD FOUNDATION

Exhibit III-16

ALL GOVERNMENTS IN THE DEVELOPED WORLD ARE TACKLING ENERGY CONSERVATION

	Government Commitment	Specific Targets	Pricing Approach	Standards & Regulations	Utilization of Waste Heat	Process Changes	Financial Incentives
Austria	Advisory Board for Energy conservation			Studying bldg insulation standards	Studying use of waste heat from generating stations; district heating using industrial by-product heat		Subsidies on insulation expenditures
Belgium	Energy Plan for 1975-85 with Inter-ministerial Committee to prevent energy wastage & an Energy Information Office	Reduce forecast energy growth by approx 19%	No increase for conservation purposes; studying rate design	Measures aimed at reducing indoor temp; speed limits & improving insulation standards	Measures for recuperation of industrial by-product heat		Subsidies to house owners & industry for energy saving investments
Bulgaria	Energy Program with energy strategy for 1975-1990 preparing program for rational use of energy & basic materials as well coordination of research of energy economy & efficiency			Systematic improvement in efficiency of appliances & equipment & improved space heating efficiency	Increased use of waste heat from thermal power stations	Replacement of industrial processes costly in energy consumption by less costly areas	
Denmark				Increased insulation requirements			Loans for industrial energy saving
Finland	Recommending & promoting voluntary economies in energy use			Improved space heating economies	Government foresees increase in combined production of power & heat & expansion of district heating		
France	Established Agence pour l'Economie d'Energie to recommend gov't policies & measures & to promote concept of conservation			Studying regulatory measures, bldg insulation standards, heat pump applications, lighting & heating limitations & energy use of large consumers	Studying uses for waste heat	Studies of recycling enery intensive materials & changes in industrial processes	
German Democratic Republic	Established yearly program for each branch & sector to supplement 5 yr plans of long term energy program (up to 1990) formulated to achieve energy savings & reduce waste. Establishment of regular energy conferences	Reduce energy consumption 5% per year (electricity 3%) during 1976-80 period		Upgrading energy use norms applied to enterprises	Research & develop on uses of waste heat. 400,000 homes connected to district heating between 1971-75 with increased expenditures planned for period between 1975-80	Studies of changes in industrial processes	
Federal Republic of Germany	Energy program updated by an "enlarged energy program" emphasizing more rational energy use, energy research programs & public information campaigns	Economies of about 18% by 1985	Price to be used with competition & market forces as the major control mechanism	Regulations enforcing higher insulation standards for new bldgs. Envisage maximum heating limits & heating equipment regulations	Studies of heat recovery	Studies of new methods of energy storage, use of heat pumps, use of low grade heat & recycling waste	Special expenditures for home insulation are tax deductable & depreciation incentives for modernizing heating installations

Exhibit III-16 (Con't)

ALL GOVERNMENTS IN THE DEVELOPED WORK ARE TACKLING ENERGY CONSERVATION

	Government Commitment	Specific Targets	Pricing Approach	Standards and Regulations	Utilization of Waste Heat	Process Changes	Financial Incentives
Greece	Law requiring all ministries of co-ordination in drawing up energy saving regulations & establishment of Nat'l Energy Council to advise on Energy policy			Improved insulation standards, lower indoor heating levels, reduced street & advertising lighting & inspection of industrial & agricultural machinery	Studies of uses for waste heat	Changes in industrial processes	
Hungary	5 yr. Energy Plan with special section on conservation aided by public info. campaigns. Energy advisors appointed in all major production units & energy saving investments given high priority	5-10% reduction in consumption by 1990	Pricing policies to be used as aid to conservation	Envision equipment control & insulation standards & peak loading limitations	Envision use of waste heat	Envision increase in use of coal & investment in nuclear energy	
Italy			Increasing oil prices to restrain demand and adopted new rate structure	Curbs on home heating and schedules for establishment of central heating in private and public sector			
Netherlands	"Integrated approach" energy policy to be followed from 1974 to 1984 with a "deliberate limitation on the growth of energy consumption" based on "maximum economy in energy consumption" - establishment of Energy Development Company to undertake practical application of promising research	4.5% growth to 1980 and 2.2% to 1985 as opposed to 5.3% and 4.2% with "no change" approach		Better insulation for new, existing buildings and central heating for new homes and limitations on space heating			Subsidies for energy conservation
Norway	Adoption of parliamentary report foreseeing priority of slowing down increase in energy consumption premised on view that GNP can grow at satisfactory rate with slower increase in energy consumption	Reduction in energy growth rate to a maximum of 3.3%-3.4% per year	Measures to raise oil and electricity prices for residential/commercial sector	Envision greater central heating, ban or tax of energy intensive articles and higher insulation standards			

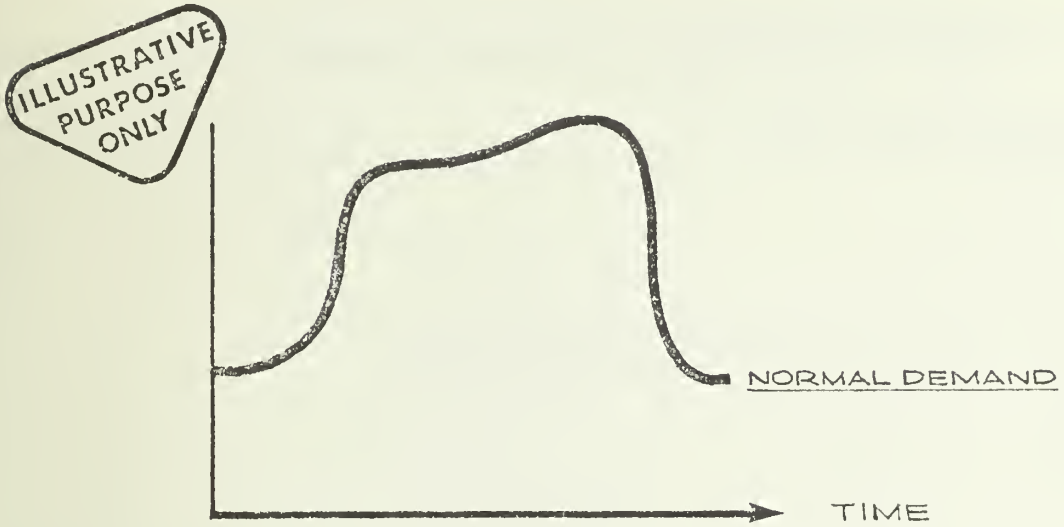
Exhibit III-16 (Con't)

ALL GOVERNMENTS IN THE DEVELOPED WORLD ARE TACKLING ENERGY CONSERVATION

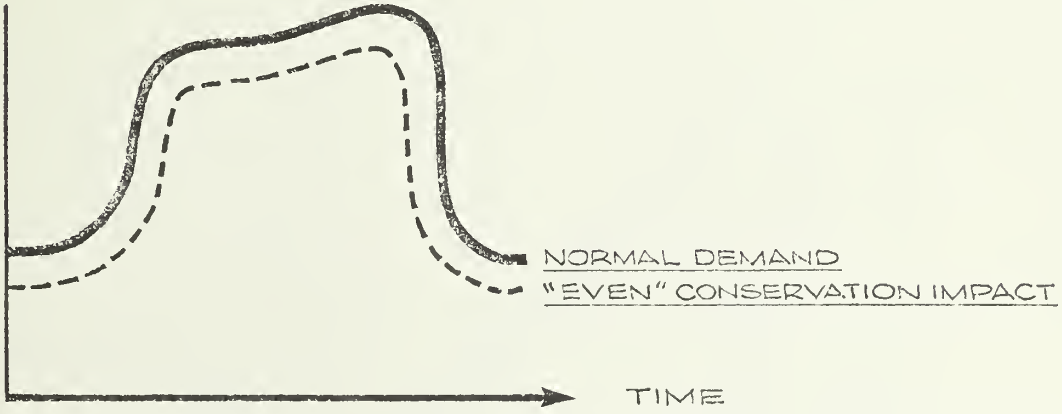
	Government Commitment	Specific Targets	Pricing Approach	Standards and Regulations	Utilization of Waste Heat	Process Changes	Financial Incentives
[illegible]	Government decree on expanding power resources and a more judicious use of fuels or power' planning a comprehensive series of measures aimed at energy economy and efficiency and focussing on the elimination of all forms of waste and loss in energy with machinery to coordinate, advise and control action taken reporting every 3 months on implementation and imposing fines for infringement			Regulations to reduce specific energy consumption per unit of output through improved manufacturing technologies and limiting heating and lighting	Measures to implement recovery of waste heat	Modernization and replacement of low efficiency combustion equipment	
Spain	Government approved National Energy Plan for 1975-1985, including policies for energy savings	10%-11% reduction in energy consumption from "no change" approach	Surcharges on industrial energy consumption exceeding 90% of previous year	Regulations to lower indoor heating levels, street lighting and higher insulation levels			
Sweden	Government adoption of energy policy law comprising measures aimed at energy saving	Consumption growth limited to 2% to 1985 and zero growth from 1990 onwards	Substantial taxes on oil and electricity	Amended building regulations to ensure energy economy	Increased emphasis on waste heat utilization and district heating		Large-scale loans and subsidies for energy saving
Switzerland			Abolition of declining block rates for electricity		District heating system being expanded		
Turkey	Government introduction of energy conservation measures			Emphasis on improvements in insulation and reduction in lighting and heating and changes in working hours to reduce peak load demands	Studies on use for heat from power stations specifically designed to make use of excess heat		
Yugoslavia		Plans a 36% reduction of energy imports by 1985		Reduction of street lighting and lighted street advertising and new insulation standards	Studying increased utilization of waste heat	Adjustment of equipment for optimal energy use and replacement of energy inefficient equipment	

Exhibit III-17

THE GENERAL ANNUAL OR DAILY DEMAND FOR ELECTRICITY . . .



. . . WILL NOT BE EVENLY REDUCED BY A CONSERVATION PROGRAM. . .



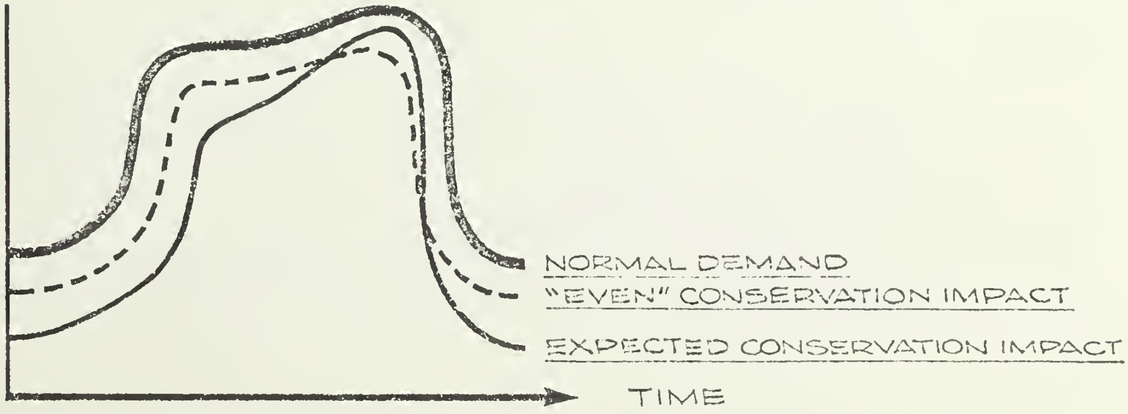
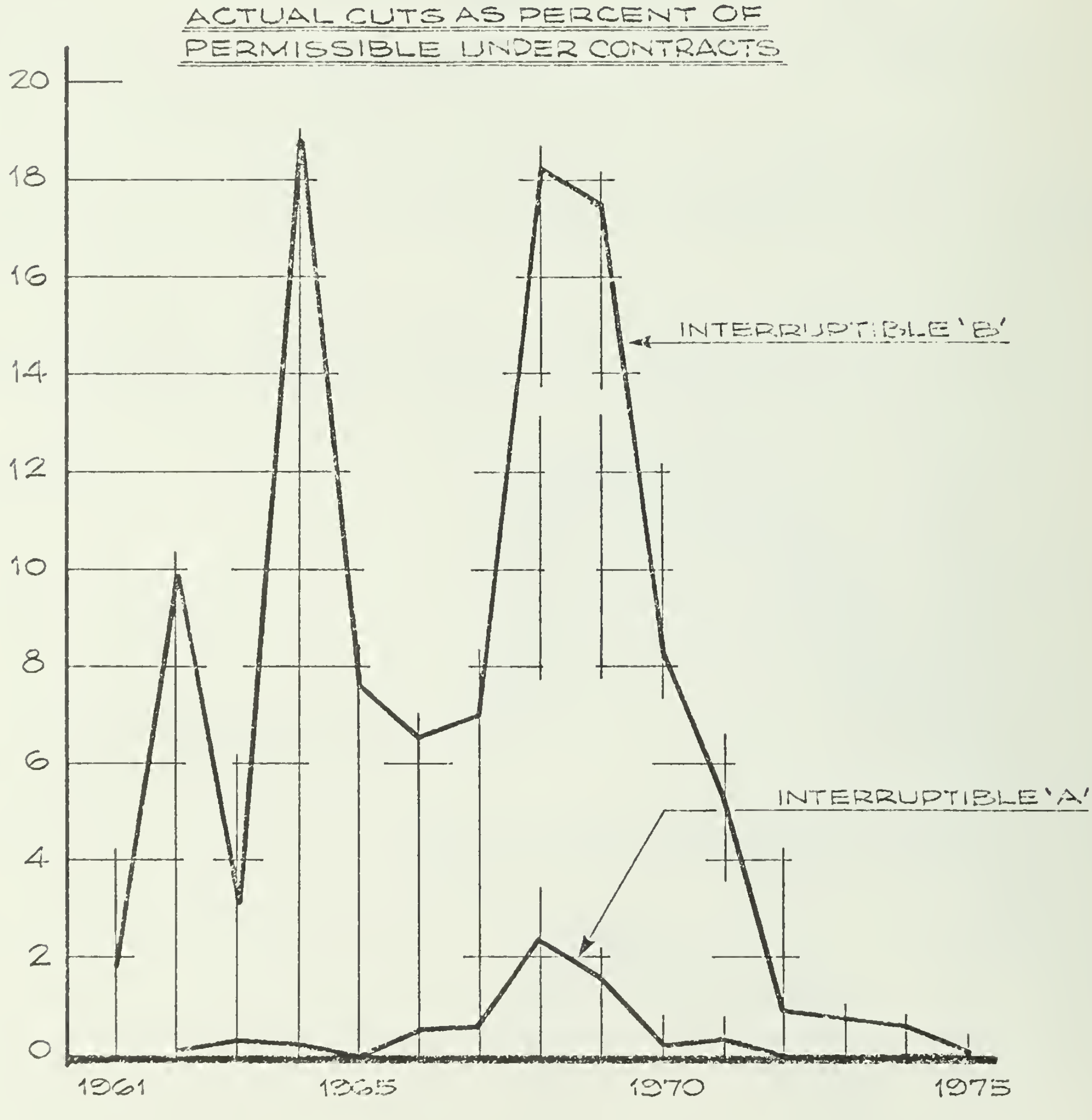


Exhibit III-18

IN RECENT YEARS INTERRUPTIBLE CUSTOMERS' LOADS HAVE SELDOM BEEN INTERRUPTED



SOURCE - ONTARIO HYDRO ANALYSIS PROVIDED TO COMMITTEE STAFF

Exhibit III-19

THE LOAD MANAGEMENT TARGETS GROW THROUGH THE DECADE TO 10% OF THE FORECAST PEAK

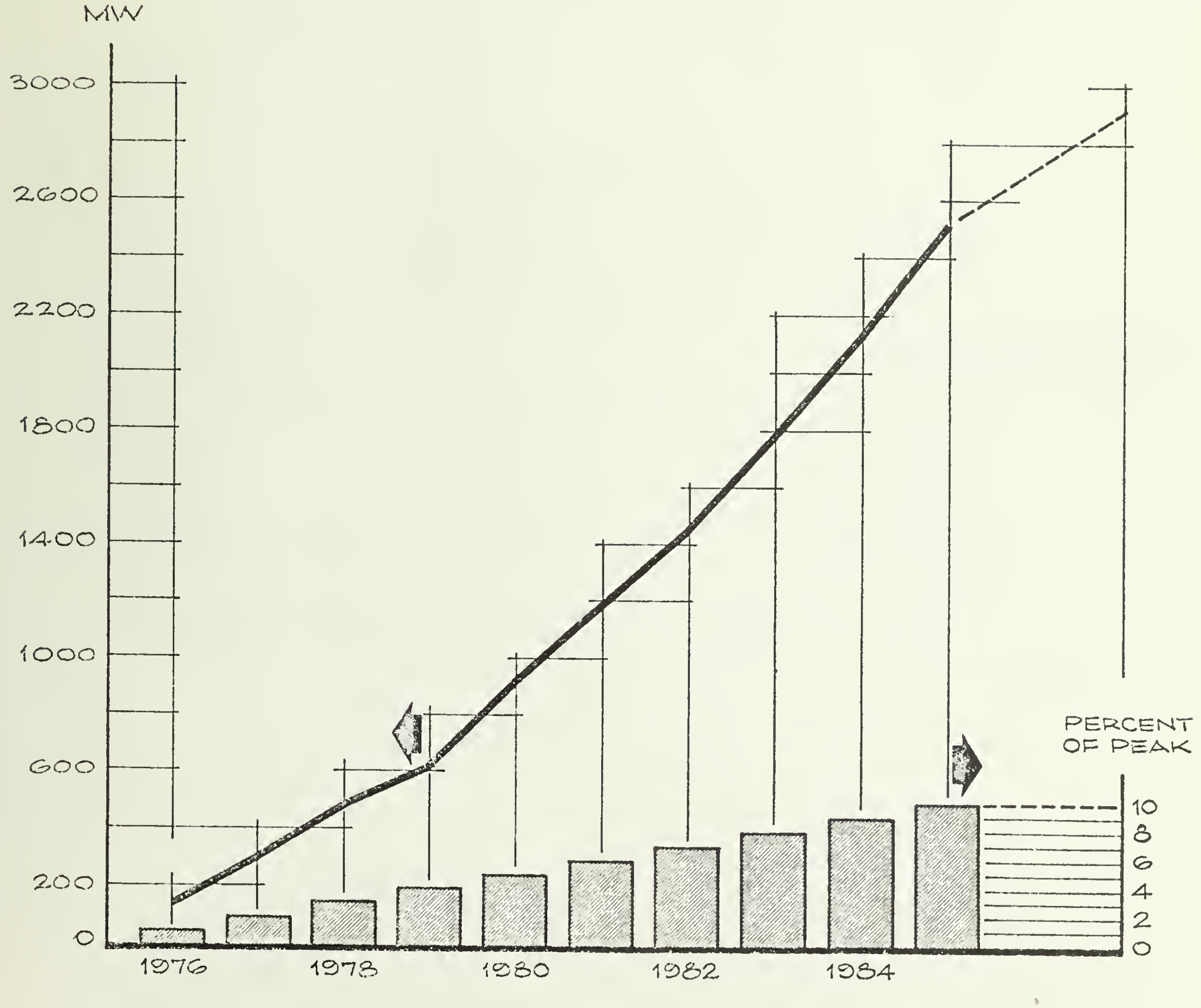
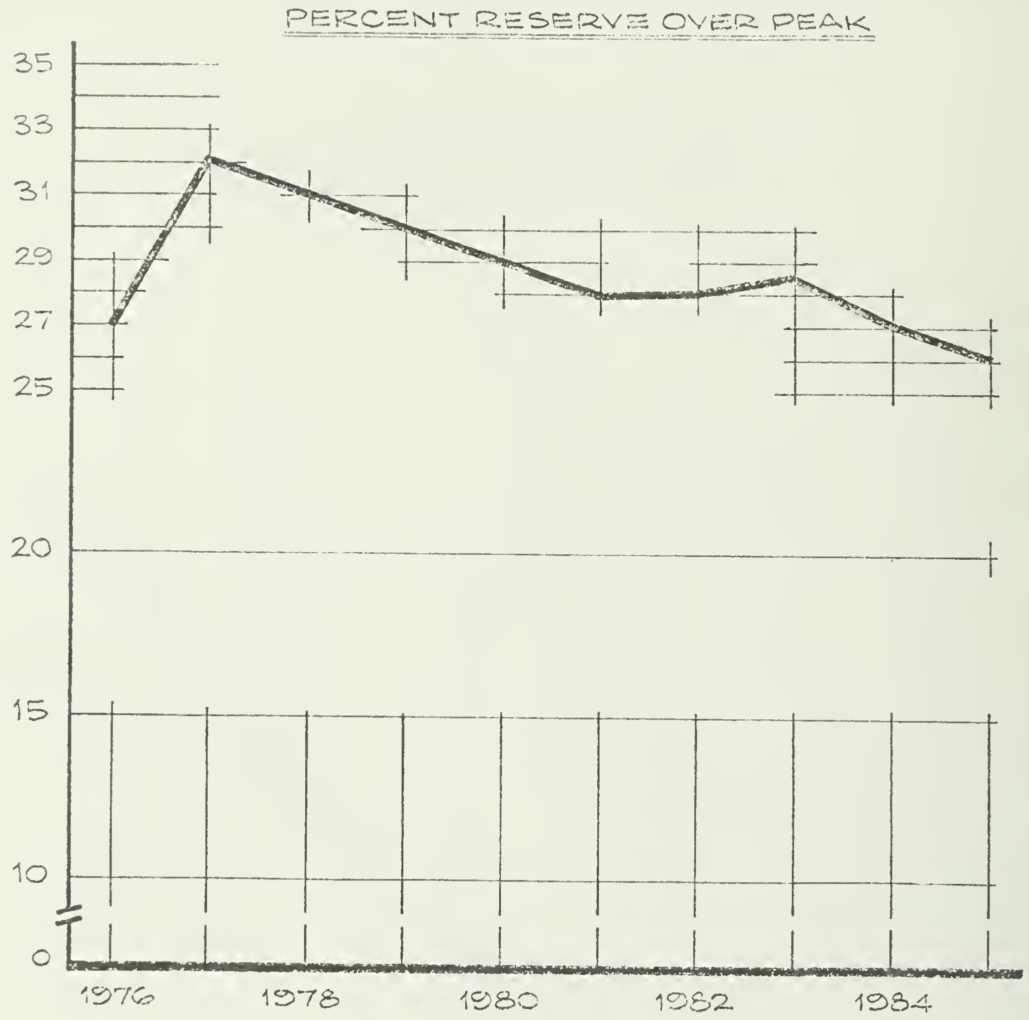


Exhibit III-20

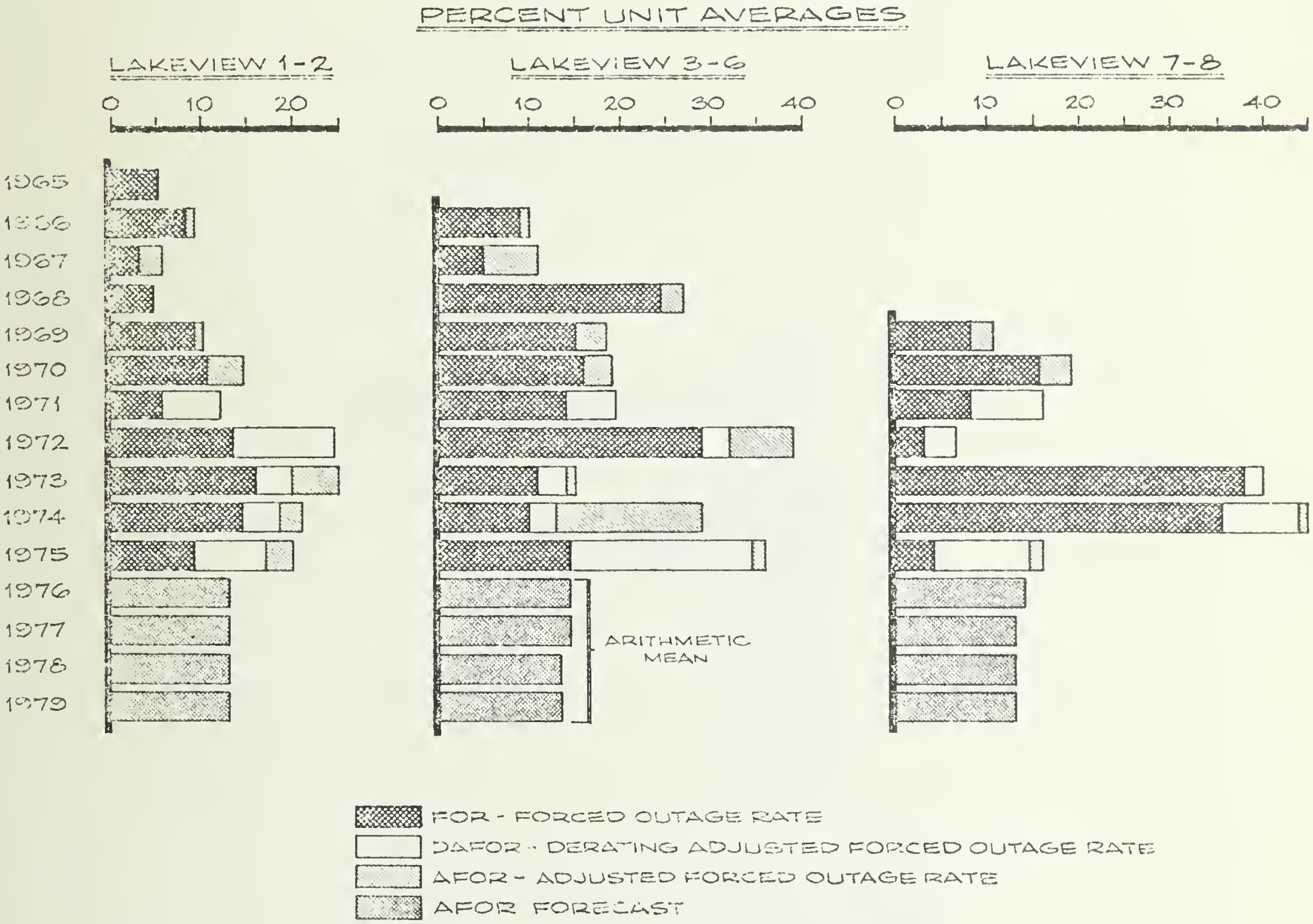
MEETING HYDRO'S RELIABILITY CRITERIA WOULD REQUIRE RESERVES OF ABOUT 30 % OVER THE PEAK FIRM LOAD



SOURCE - ONTARIO HYDRO SUMMARY SUBMISSION, EXHIBIT B-87

Exhibit III-21

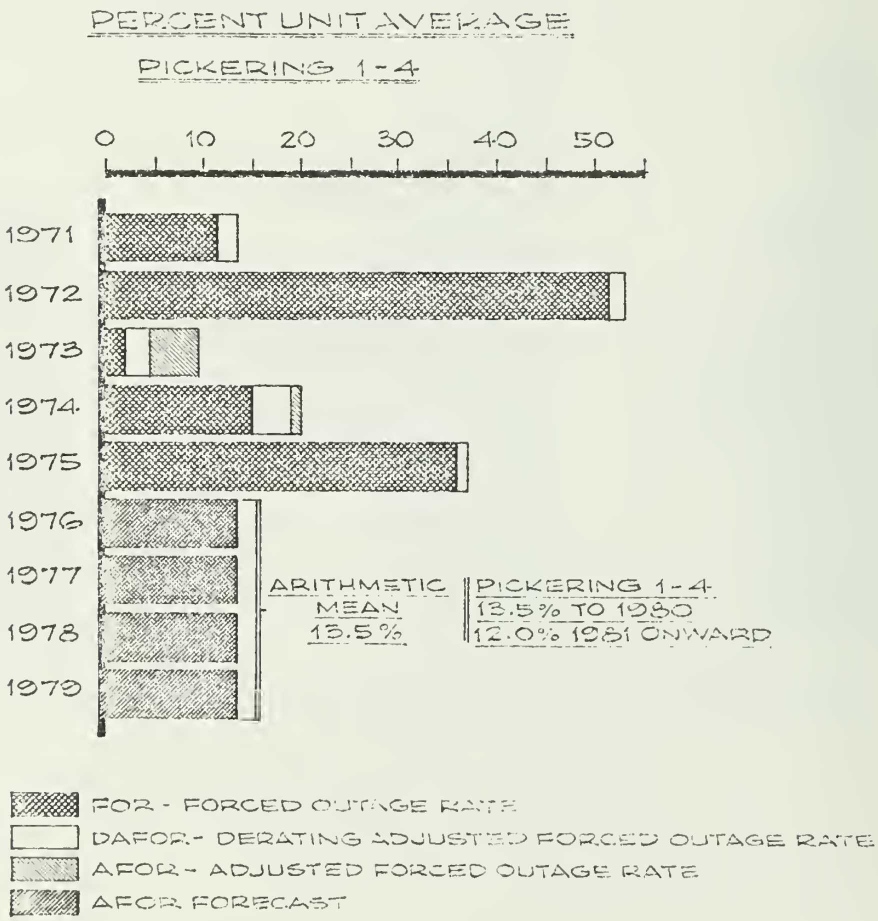
THE GENERATION RESERVE PLANNING CALCULATIONS IS BASED ON A SINGLE FORECAST OF HIGHLY VARIABLE ACTUAL FORCED OUTAGES



SOURCE - ONTARIO HYDRO EXHIBIT B-42

Exhibit III-22

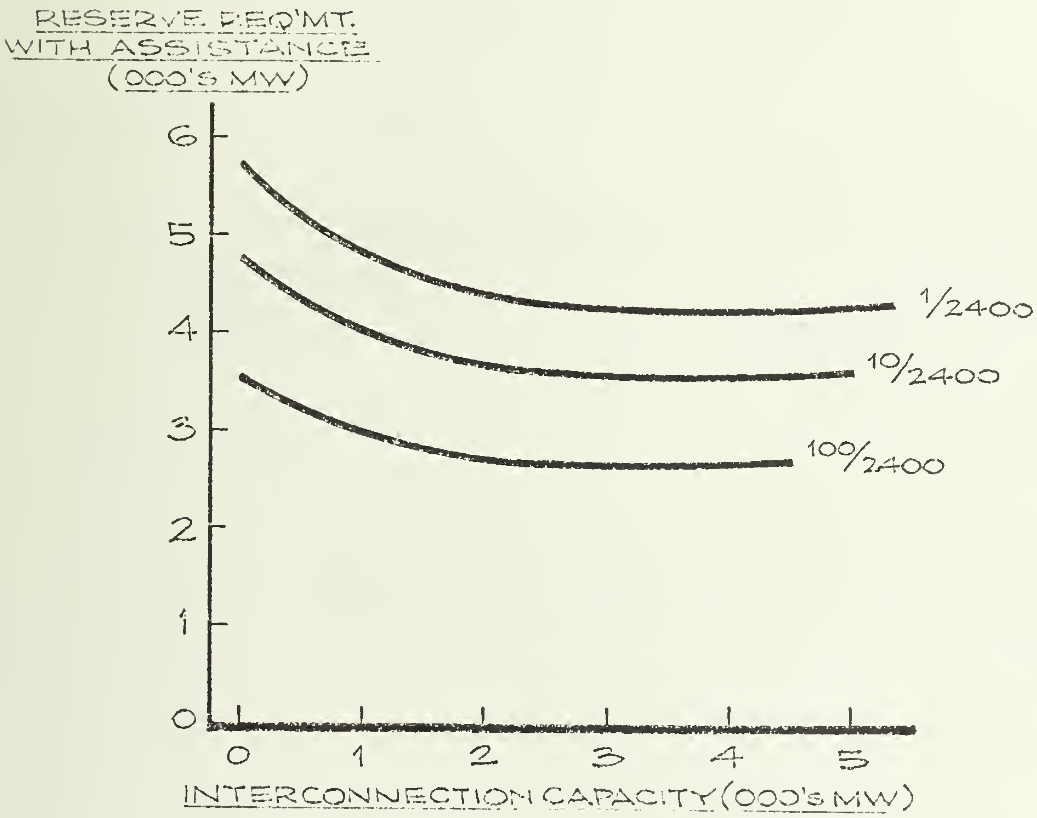
THE PERFORMANCE OF THE PICKERING NUCLEAR STATION HAS BEEN ERRATIC TO DATE



SOURCE - ONTARIO HYDRO EXHIBIT B-42

Exhibit III-23

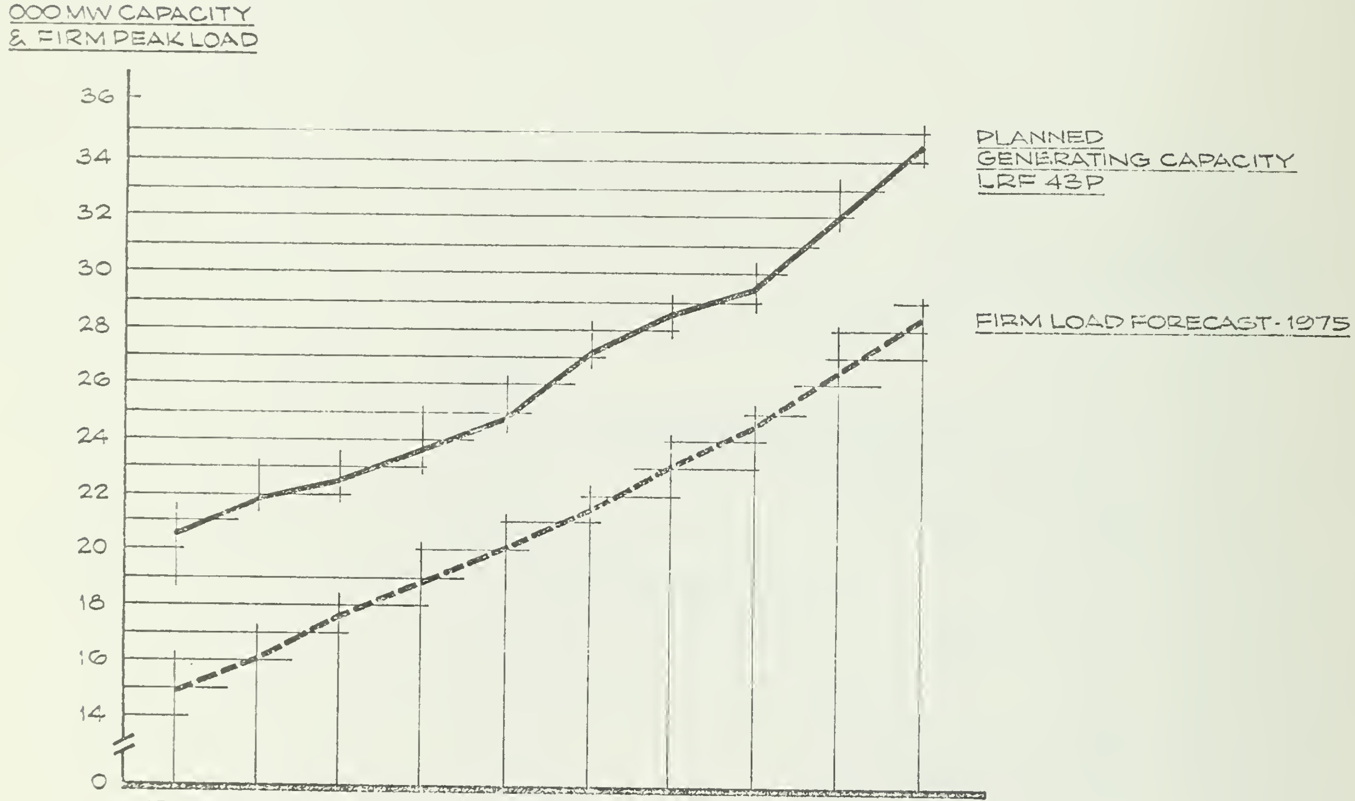
HYDRO PRESENTED FIGURES THAT SHOWED, THEORETICALLY, THAT RESERVES COULD BE REDUCED BY 1200 TO 1600 MW IF TWO RELIABILE SYSTEMS ARE INTERCONNECTED



SOURCE - ONTARIO HYDRO, EXHIBIT B-44

Exhibit III-24

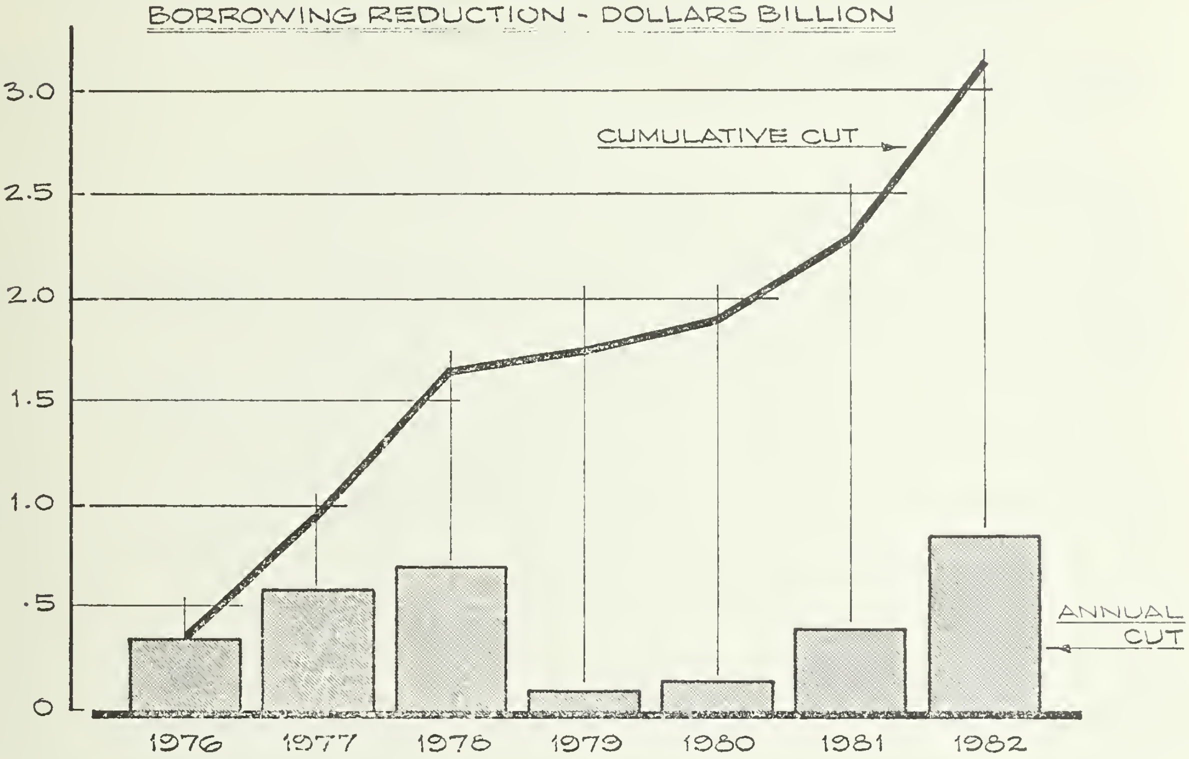
AT THE TIME OF THE FIRST COMMITTEE SESSION, HYDRO'S GENERATION PLAN WAS BASED ON LOAD GROWTH THAT AVERAGED 7.2% PER ANNUM



SOURCE - ONTARIO HYDRO, EXHIBIT B-11.
STAFF ANALYSIS OF HYDRO MATERIAL

Exhibit III-25

IN JANUARY, THE TREASURER SET LIMITS THAT SIGNIFICANTLY CUT HYDRO'S BORROWING PLANS FOR THE NEXT SEVEN YEARS



SOURCE - LETTER FROM PROVINCIAL TREASURER TO HYDRO CHAIRMAN, EXHIBIT B16

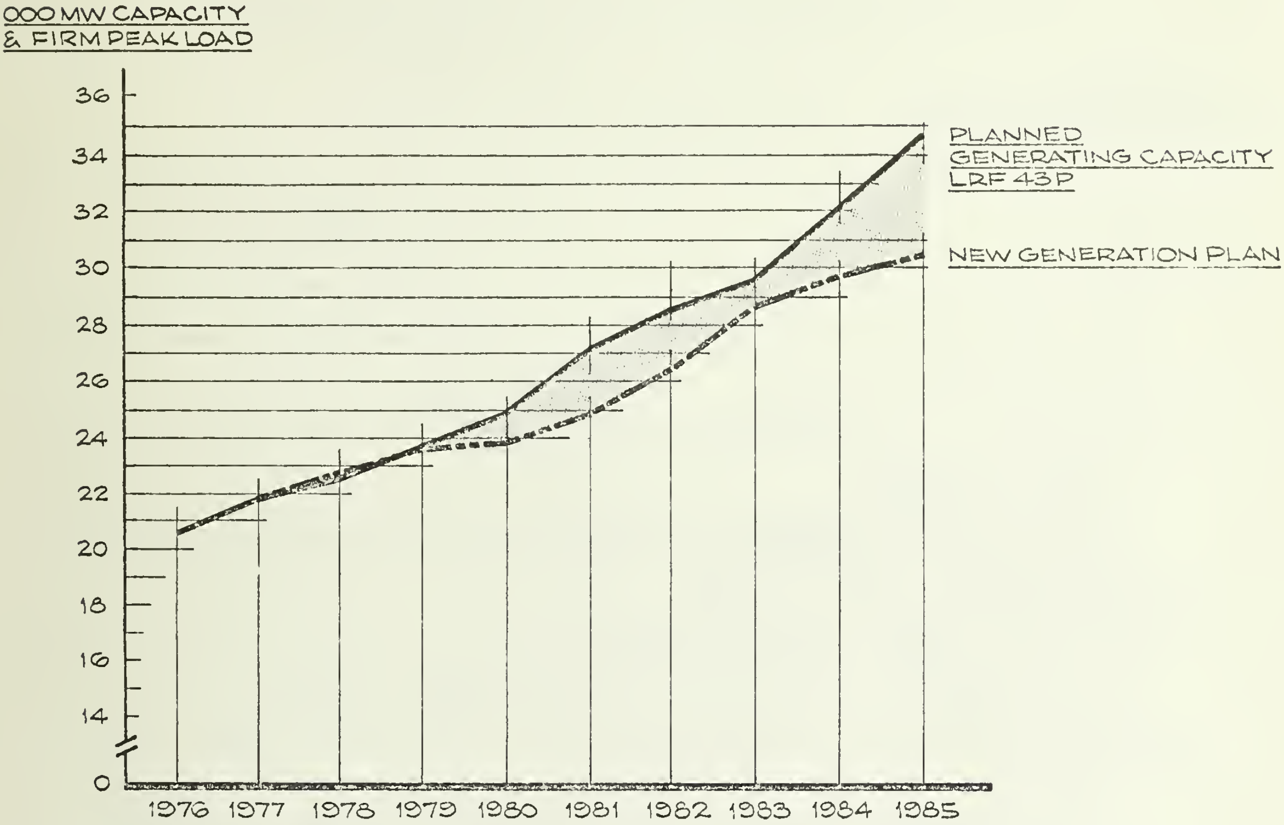
Exhibit III-26

TO MEET THE CAPITAL CONSTRAINT, HYDRO KEPT ITS GENERATION PLAN ESSENTIALLY INTACT, BY DEFERRING ELEVEN PROJECTS BY ONE OR TWO YEARS

ONE YEAR DEFERRAL	TWO YEAR DEFERRAL	CANCELLATION
Pickering B. Nuclear G.S.	Wesleyville Oil G.S.	Bruce Heavy Water C
Bruce B. Nuclear G.S.	Darlington Nuclear G.S.	
Atikokan Coal G.S.	North Channel Coal G.S.	
Northwestern Coal G.S.	Bruce Heavy Water D	
Thunder Bay		
Bruce Steam Plant		

Exhibit III-27

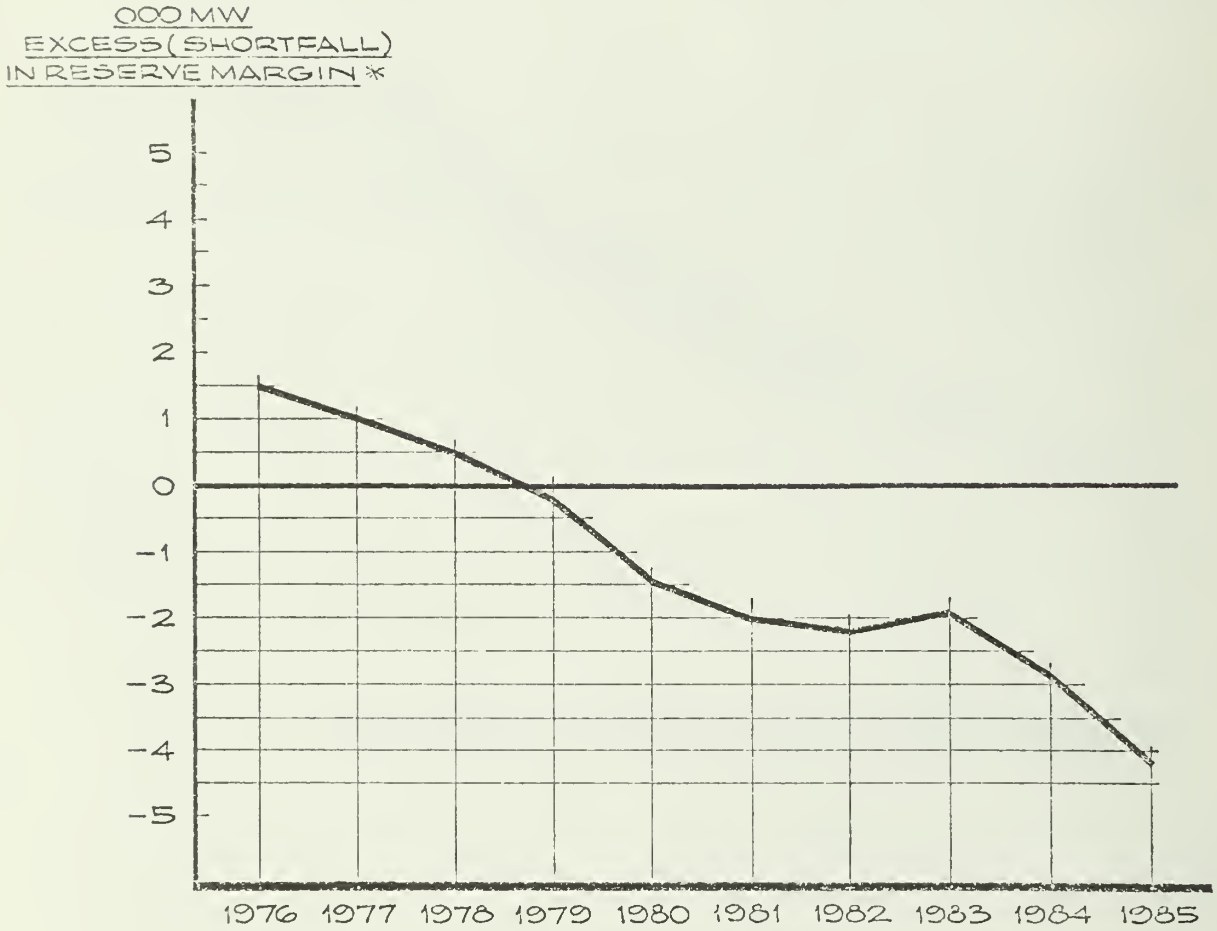
THE "STRETCH OUT" OF THE GENERATION PROGRAM REDUCED THE AMOUNT OF GENERATING CAPACITY PLANNED FOR THE EIGHTIES



SOURCE - STAFF ANALYSIS OF HYDRO MATERIAL

Exhibit III-28

BASED ON THE 1975 LOAD FORECAST, IT APPEARED THAT THE NEW SYSTEM EXPANSION PLAN WOULD RESULT IN SHORTAGES OF ELECTRIC POWER IN THE EARLY EIGHTIES

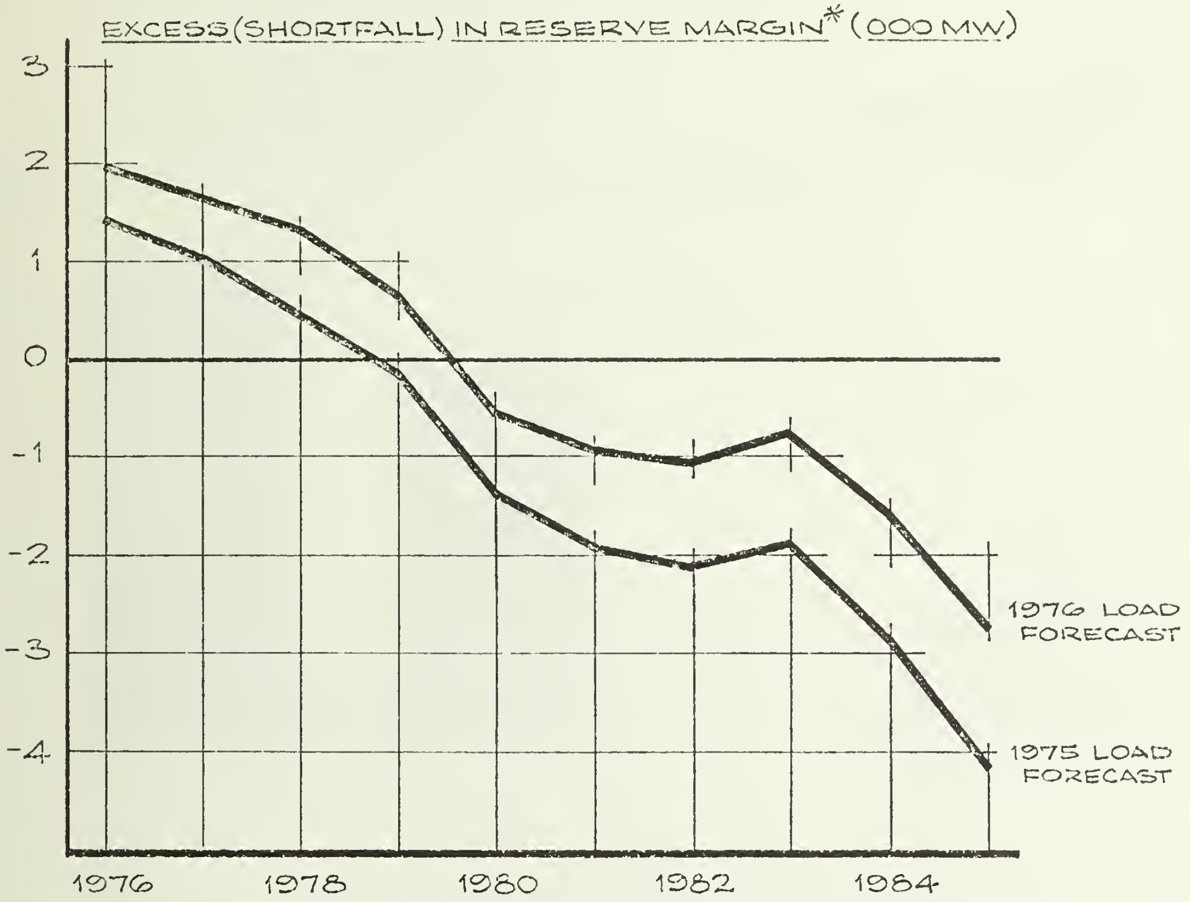


* HEAVY WATER PLANT LOAD CONSIDERED INTERRUPTIBLE

SOURCE - STAFF ESTIMATES BASED ON INFORMATION SUPPLIED BY ONTARIO HYDRO

Exhibit III-29

THE NEW LOAD FORECAST DID NOT SHOW DEMAND FALLING SUFFICIENTLY TO OVERCOME THE SHORTFALL

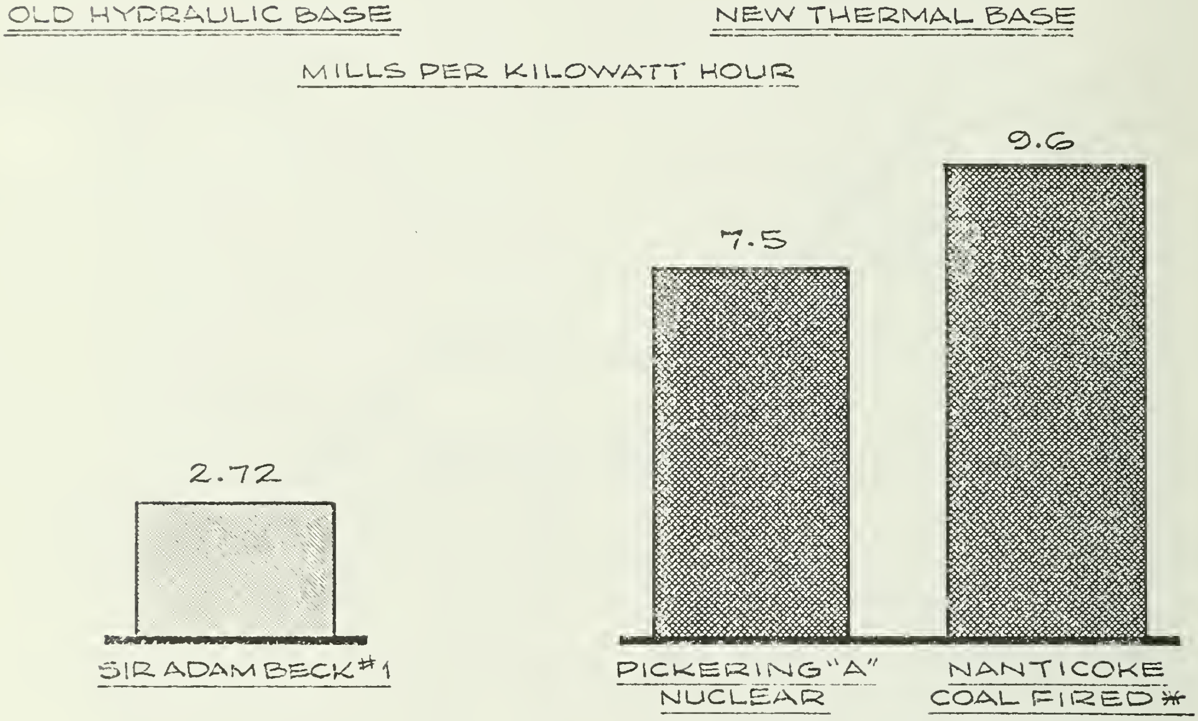


* HEAVY WATER PLANT LOAD CONSIDERED INTERRUPTIBLE

SOURCE - STAFF ESTIMATES BASED ON INFORMATION PROVIDED BY ONTARIO HYDRO

Exhibit III-30

HYDRO'S NEW THERMAL GENERATING CAPACITY OPERATES AT COST LEVELS FAR ABOVE THE COST OF THE OLD HYDRAULIC CAPACITY

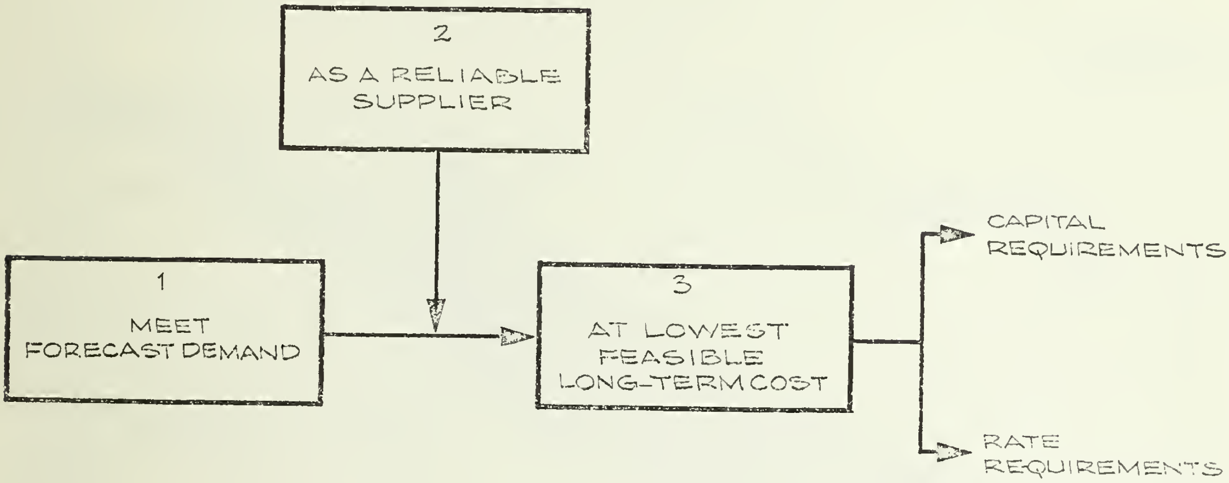


* DOES NOT INCLUDE CAPITAL CHARGES

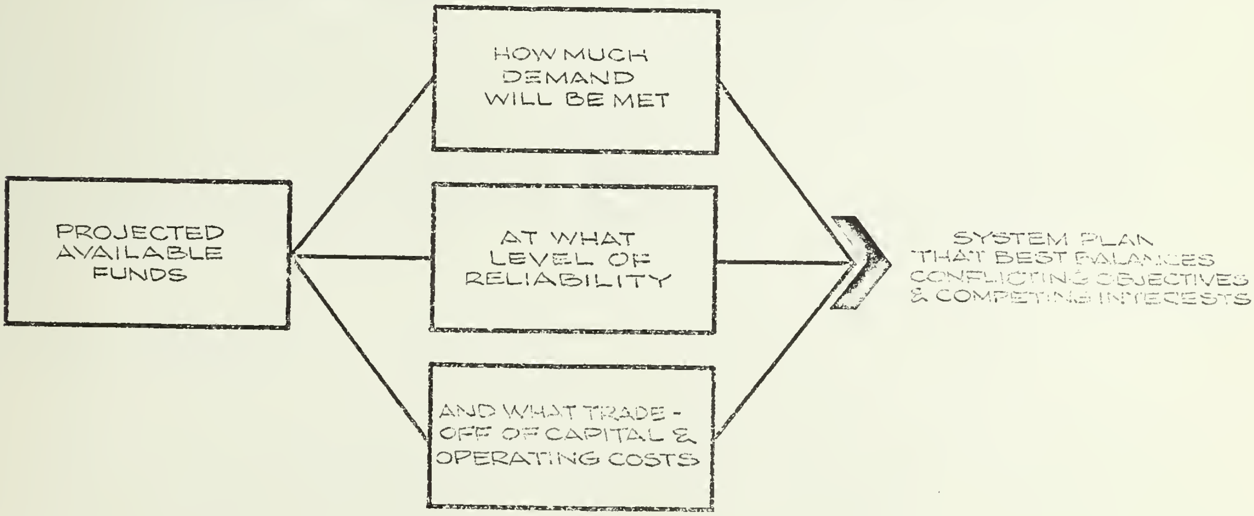
SOURCE - ONTARIO HYDRO SUBMISSION TO ONTARIO ENERGY BOARD, 1976 & ADDITIONAL INFORMATION SUPPLIED TO COMMISSION STAFF

Exhibit III-31

HYDRO'S SEQUENTIAL PROCESS OF PLANNING ADDITIONS TO GENERATION MET ITS OBJECTIVES, AND RESULTED IN DEFINED NEEDS FOR BORROWING AND RATES



NOW, CAPITAL LIMITATIONS WILL FORCE HYDRO TO CHANGE ITS PLANNING PROCESS TO A MORE ITERATIVE ONE THAT PRODUCES A BALANCED EXPANSION PLAN


HOW MUCH DEMAND WILL BE MET
PROJECTED AVAILABLE FUNDS
AT WHAT LEVEL OF RELIABILITY
AND WHAT TRADE-OFF OF CAPITAL & OPERATING COSTS
SYSTEM PLAN THAT BEST BALANCES CONFLICTING OBJECTIVES & COMPETING INTERESTS

HYDRO'S BOARD HAD OPTED TO MEET THE DEMAND WHILE SACRIFICING SOME RELIABILITY

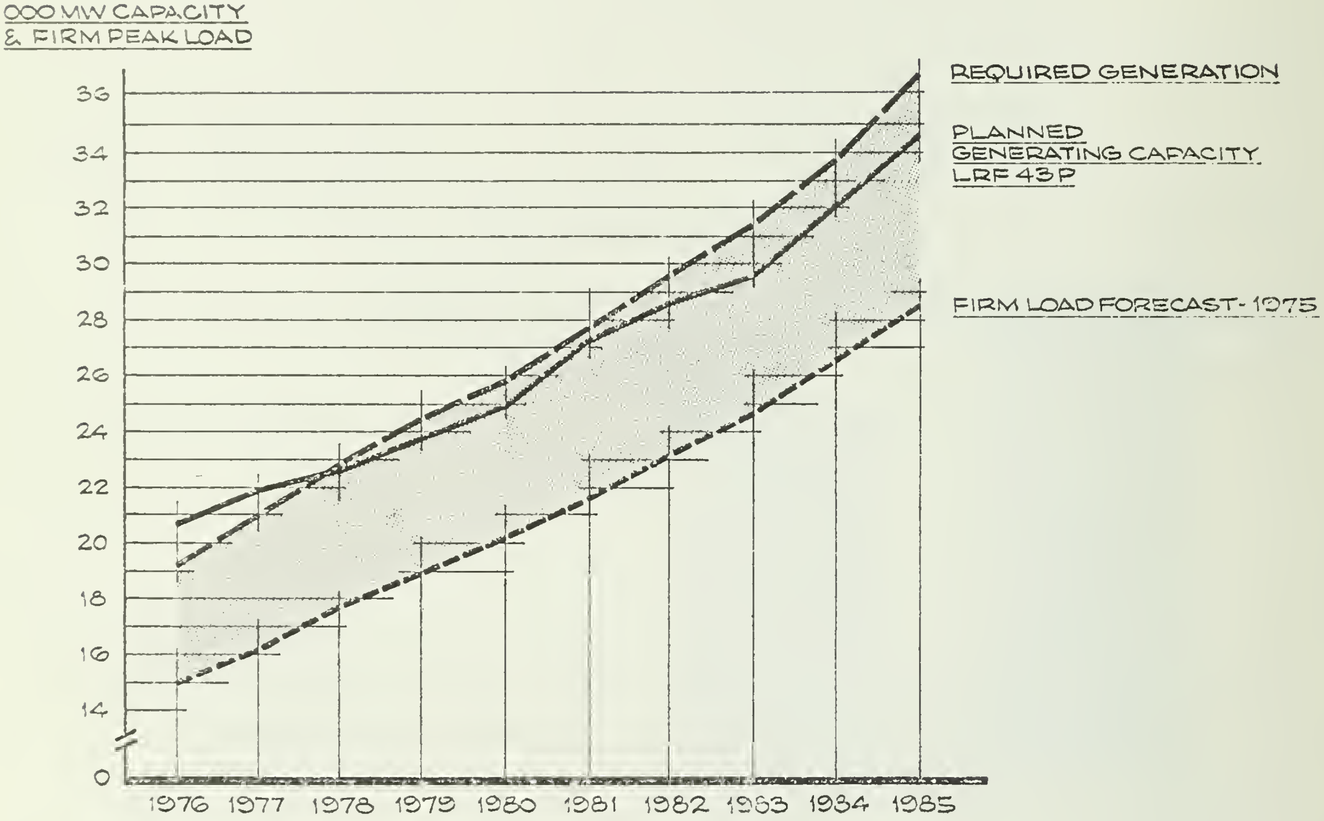
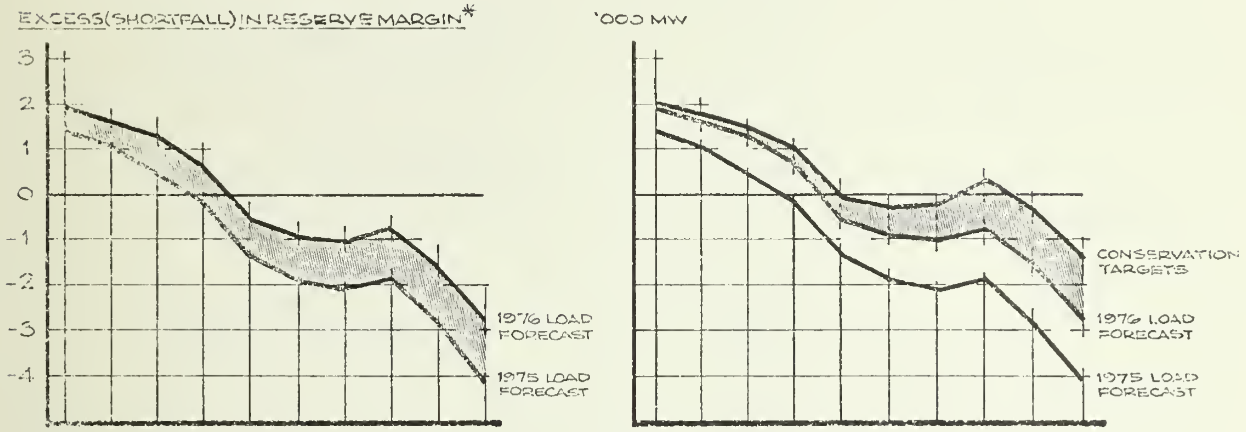


Exhibit III-33

THE ACTIONS OF ONTARIO HYDRO AND THE COMMITTEE CHANGED AN APPARENT PLANNED SHORTFALL INTO A SURPLUS . . .

1. When the load forecast changed. . .

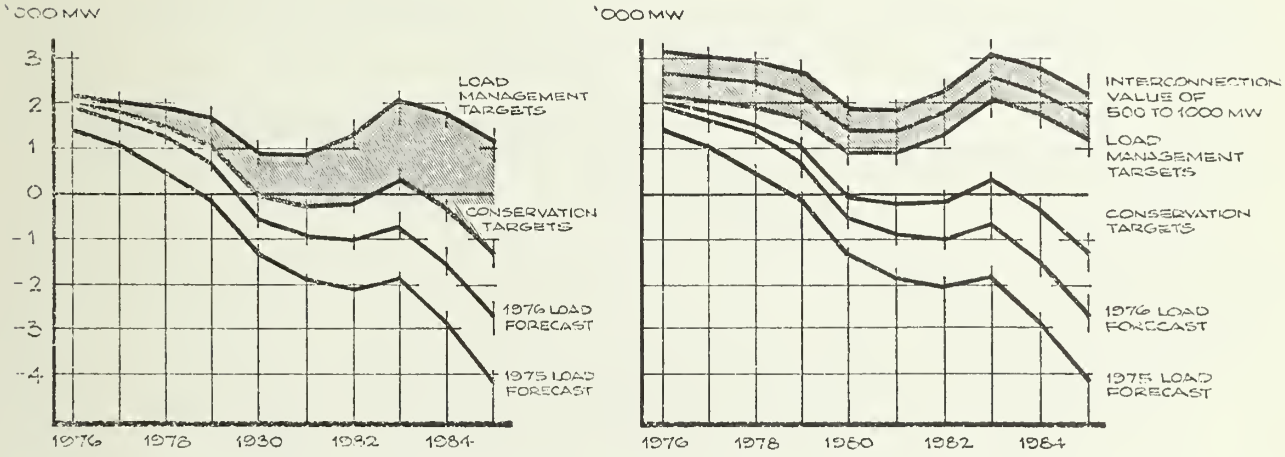
2. Conservation targets were set and extended . . .



* HEAVY WATER PLANT LOAD CONSIDERED INTERRUPTABLE.

. . . 3. Load Management targets were established . . .

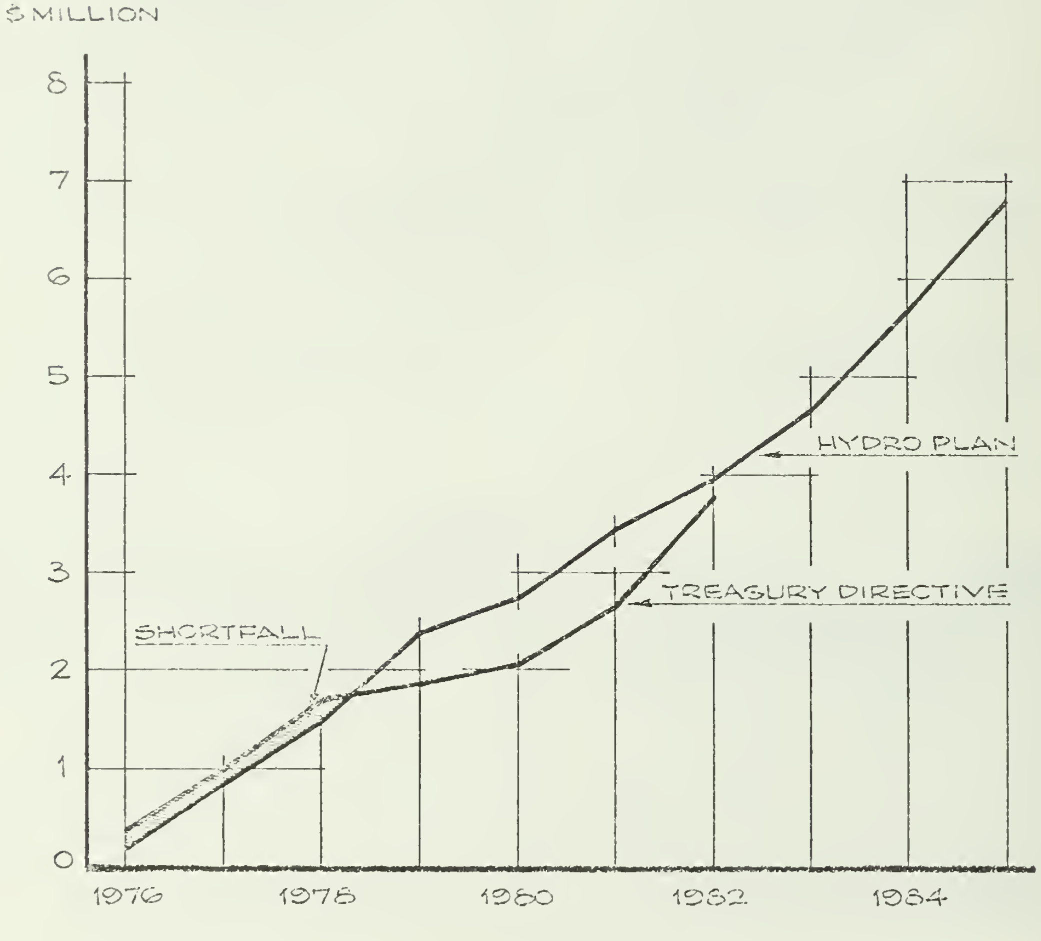
. . . 4. And some value is put on interconnections



SOURCE - STAFF ANALYSIS

Exhibit III- 34

HYDRO'S CURRENT PLAN FAILS TO MEET THE GUIDELINE FOR CAPITAL REDUCTIONS IN EACH OF THE NEXT THREE YEARS



SOURCE - ONTARIO HYDRO SUMMARY SUBMISSION EXHIBIT 6-87

DIRECT COSTS OF DEFERRAL PROGRAM

	$ Million
Cancellation Penalties	70
Storage and Overhead	80
Added Interest	220
	$370

Source: Ontario Hydro
Exhibit B-92

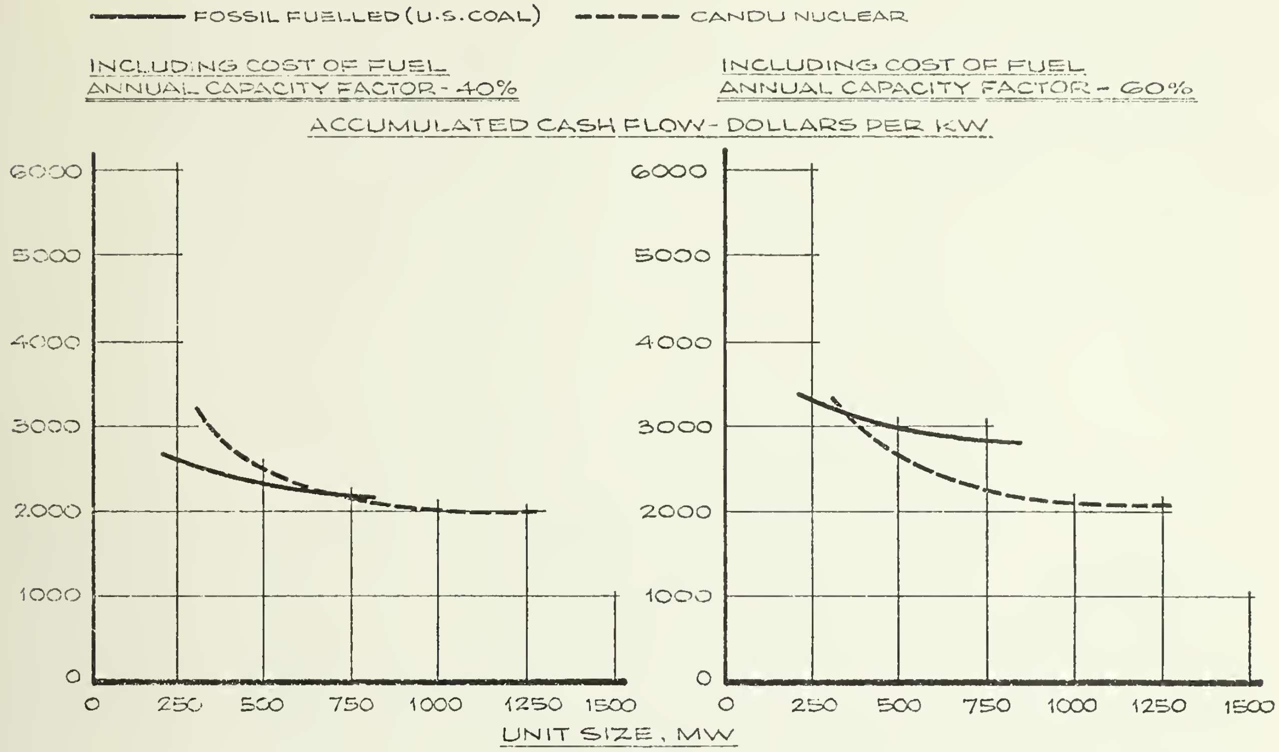
Exhibit III-36

HYDRO ELECTRIC STATIONS REMOVED FROM SERVICE BY ONTARIO HYDRO SINCE 1950

Date Retired	Name	Capacity (MW)
1950	Carleton Place	0.5
1952	Whitefish Falls Birch Lake	less than 0.1
1955	Wasdells Falls	0.9
1957	Bala	0.4
1958	Rat Rapids	1.2
1959	Fenelon Falls	0.7
1960	Burks Falls	0.5
1960	Walkerton	0.3
1961	Kagawong	0.1
1967	Hanover	0.2
1971	Upper Notch Fountain Falls	Removed from service with flooding of Lower Notch Headpond
1974	Toronto Power	120.0

Exhibit III-37

THE ECONOMICS ONLY SLIGHTLY FAVOUR NUCLEAR PLANTS OVER FOSSIL PLANTS AT NORMAL CAPACITY FACTORS



COST EXPRESSED IN DOLLARS PER KILOWATT OF LOAD-MEETING CAPABILITY

SOURCE - ONTARIO HYDRO EXHIBIT B-43

New Guidelines for Electric Power Rates

New Guidelines for Electric Power Rates

PART IV

NEW GUIDELINES FOR ELECTRIC POWER RATES

Ontario Hydro's principal source of revenue is its sales of large quantities of electric power to about 100 industrial consumers and to the 353 municipal utilities that deliver power to most individual users. These sales - referred to as bulk power sales - are not Hydro's only source of revenue. Hydro operates a retail distribution system in certain rural areas of the Province, selling directly to individual consumers. As well, Hydro sells surplus electric power, when it is available, to neighbouring utilities under a variety of arrangements. These sales are referred to as secondary sales.

Revenues raised through the sale of bulk power at rates set after review by the Ontario Energy Board are the major source of cash for operating, maintaining, building and paying for Hydro's enormous generation and transmission system. Principally through the bulk power revenues, Hydro must generate enough cash to operate and to provide a basis for financing one of the largest electric generation systems in North America, probably the largest construction operation in the country (building new Hydro facilities), and what will become one of the largest chemical complexes in the world (producing heavy water).

The Committee's terms of reference directed it to review Ontario Hydro's proposal to increase bulk power rates for 1976 in light of the Anti-Inflation Program of the Government of Canada, in relation to Ontario Hydro's obligation to provide power at cost, and with regard to several other factors. Among the other factors the Committee was directed to have regard for were the recovery of additional operating costs, maintenance of Hydro's financial integrity and dependence upon an adequate electric supply for Ontario's future well-being. The specific reference to these related factors led the Committee to a detailed examination of Hydro's system expansion plans. The results of that examination are set out in Part III of the report immediately above. In addition, however, the terms of reference made it clear that the Committee should not examine the bulk power rate in isolation from its many impacts on the current and future economic life of the Province.

This part of the report is presented in three chapters. In the first chapter, the Committee examines the federal Anti-Inflation Program and its implications for the allowable bulk power rate increase. In the second chapter, the Committee breaks down the various components of revenue and expenses, and draws conclusions about Hydro's rate needs in 1976. In the third chapter, the Committee anticipates Hydro's future costs, showing the impact of a reduced system expansion plan, and indicates the need for Hydro to use its full regulatory authority to control increases in the power rates that apply directly to the consumer.

CHAPTER IV-1

REVIEWING THE RATE INCREASE IN RELATION TO THE ANTI-INFLATION PROGRAM

In accordance with its terms of reference, the Committee reviewed Ontario Hydro's proposal to increase bulk power rates for 1976 to determine whether, in the opinion of the Committee, the rate proposal was in keeping with, or supportive of, the Anti-Inflation Program of the Government of Canada and the commitment of the Government of Ontario to that program. In so doing, the Committee had regard to the policy statement tabled in the House of Commons by the Hon. Donald S. Macdonald, Minister of Finance, on October 14, 1975, the Anti-Inflation Act, the Regulations to the Act, the Memorandum of Agreement between the Government of Canada and the Government of the Province of Ontario, and the Government of Canada's recently released "Energy Strategy for Canada." In this chapter, the Committee recommends that Hydro's rates be reviewed under the general intent of the Act and Regulations. It then goes on to apply the general intent to Hydro's forecast of costs in 1976.

BRINGING HYDRO UNDER THE ANTI-INFLATION PROGRAM

On October 14, 1975, the Hon. Donald S. Macdonald presented a policy statement in the House of Commons entitled "Attack on Inflation - A Program of National Action." The statement outlined a program that the Government of Canada would be setting in motion to control prices and incomes. While the Committee's terms of reference directed it to determine whether Hydro's proposed rate increases were in keeping with the federal Anti-Inflation Program, it has become clear that the program was never intended to apply to Ontario Hydro. The initial policy statement excluded energy prices, the Province's Memorandum of Agreement excluded Ontario Hydro, and the recent federal energy strategy paper reaffirmed the federal commitment to higher energy prices.

The October 14 announcement by the Minister of Finance included a statement suggesting that energy prices would not be dealt with under the Anti-Inflation Program:

> "The situation in the energy field provides perhaps the clearest illustration of the difficult problems that must be overcome in finding and maintaining the right balance between a general policy of lowering the overall inflation rate and the need to permit an orderly upward adjustment of the relative prices of certain important products and services."

The policy statement envisaged a "balance between a general policy of lowering the overall inflation rate and the need to permit an orderly upward adjustment of the relative prices of certain important products and services." This statement suggests that the program was not intended to be strictly applied for certain important products and services. Furthermore, the statement recognized that "major efforts are also required to develop and exploit energy supplies efficiently and to limit further increases in the real cost of energy in the future." This statement could be directed specifically to Ontario Hydro's commitment to nuclear generation. Finally, the statement dealt with the requirement for "major structural shifts in patterns of production and consumption towards using less energy per unit of national activity..." and asserted that "facing consumers and producers with higher relative prices for energy is the most important single policy available to promote effective use and production of energy." In recommendation III-13, the Committee noted that in trying to understand the federal policy statement and apply the Anti-Inflation Act and Regulations to Hydro's rates, it should be aware that the Federal Government accepted the need for continued increases in Canadian energy prices. Clearly, the Federal Government did not believe that its energy pricing policy should be tempered by the Anti-Inflation Program.

When the Committee considered the Anti-Inflation Program in its interim report, it did not know what the Province's commitment to the program entailed. On January 13, 1976, the Government of Canada and the Government of Ontario signed a Memorandum of Agreement providing for the direct application of the Anti-Inflation Act and the Regulations to specified sectors of the Province's public sector. The Memorandum was a tangible indication of the commitment of the Government of Ontario to the Anti-Inflation Program. On careful examination, the Committee was able to conclude that the provincial and federal governments had agreed that the Regulations would not apply to Ontario Hydro.

Finally, the exclusion of energy prices from the Regulations was confirmed by the recently released "Energy Strategy for Canada," which stated that:

> "The Government of Canada recently introduced an Anti-Inflation Program directed at reducing the overall rate of inflation in Canada. In introducing this program, however, the need for continued increases in Canadian Energy prices was explicitly recognized."

The energy strategy report clearly considers electricity as an essential component of the overall energy situation. The Memorandum of Agreement did not include Ontario Hydro's bulk power rates as a portion of the provincial public sector to which the Regulations should apply. And, the Committee thought that the Regulations were an inappropriate mechanism to control the rates of a quasi-governmental Crown Corporation that depends on its rates as its main source of internally generated capital and is an instrument for carrying out Provincial Government policy. The Committee had regard for the fact that Ontario Hydro's costs are now carefully scrutinized during public hearings by the Ontario Energy Board and that, unlike the gas utilities, Hydro is not motivated by shareholder pressure. As well, the Committee was aware that Hydro has a vital role in ensuring a degree of energy self-reliance for the Province and in limiting the real costs of electricity in the future.

The Committee is aware, however, of the potential impact of an excessive electric rate increase on individuals and the provincial economy. For this reason, although Ontario Hydro need not strictly apply the Anti-Inflation Act and Regulations to its bulk power rates, Hydro must be seen to be supportive of the intent of the Anti-Inflation Program.

The Committee recommends that:

IV-1 THE ONTARIO GOVERNMENT ENSURE THAT HYDRO'S BULK POWER RATE INCREASE COMPLY WITH THE GENERAL INTENT OF THE ANTI-INFLATION PROGRAM.

APPLYING THE GENERAL INTENT

The Committee examined Hydro's rate proposal, then, in relation to the general intent of the program as set out in the Regulations. Generally, the program envisages restraints on prices and profit margins founded upon a formula that measures the actual financial results for a given period called the "compliance period" against the financial results of a predetermined "base period."

The detailed Regulations divide business into four categories with different rules applying to each. To apply the intent of the Regulations, Ontario Hydro had to be fitted into one of the business categories. The Committee concluded that two business categories may be applicable: the "unit-cost" category and the "net-margin" category. The unit-cost category applies to those parts of business in which the supplier is not acting as a distributor to which "costs" can be allocated to individual products for the base period. It was the view of the Committee that Ontario Hydro was not acting as a "distributor," and that it may be possible to allocate costs to individual products. The Committee therefore applied generally the intent of the Regulations for a business in the unit-cost category to test for broad compliance with the Anti-Inflation Program. Since there were serious difficulties with the assumptions underlying the application of the unit-cost category to Hydro, the Committee applied the intent of the Regulations for a business in the net-margin category as well. The net-margin category is intended for those businesses to which no other category can apply.

For calculations assuming that the unit-cost rules would apply, the Committee, following the general intent of the Regulations, determined as the appropriate base period the last completed fiscal period of 183 days or more prior to October 14, 1975. For Ontario Hydro this is the year ending December 31, 1974. For the calculations assuming that the net-margin rules would apply, the Committee, again following the general intent of the Regulations, determined as the appropriate base period the last five completed fiscal periods prior to October 14, 1975. For Ontario Hydro, this base period is the years ending December 31, 1970 through to and including 1974. The Committee was aware that the financial information required for the base period was to be prepared in accordance with generally accepted accounting principles and practices, and applied on a basis consistent with that used in the last fiscal period included in the base period. As well, the Committee was aware of the definitions for "adjusted operating profits," "gross revenue from operations" and "allowable costs."

Since many of the rules restricting price increases necessitate a determination of the extent to which a supplier's costs have increased since the base period, the definition of allowable costs is limited to outlays and expenses that can reasonably be regarded as having been made or incurred for the purpose of earning adjusted operating profits. As a result, as in its interim report, the Committee treated both the debt retirement charge and the system expansion charge as net income or profit and not as a cost.

The definition of allowable costs contains a list of items specifically excluded, including excess "restricted expenses." These are expenses considered to be of a more discretionary nature, which are restricted in the amount that can be included during the period under scrutiny. The Committee made no attempt to calculate the applicable restricted expenses. It determined that there would be serious difficulties in attempting to compile the relevant data, and that it was unlikely that the calculations would alter the Committee's conclusions significantly. In addition, it was guided by its earlier recommendation (IV-1) that there was no reason to apply the Regulations strictly.

Essentially, the Committee followed the flow and intent of the Regulations, to determine the appropriate business category and base period, and gathered the appropriate base period information (Exhibits 1, 2 and 3). The Committee determined that the appropriate compliance period for Ontario Hydro, for both the unit-cost and net-margin categories, was January 1, 1975 to December 31, 1976. (A compliance period is any fiscal period subsequent to the base period.) Generally, the Regulations require a calculation to be made of the "excess revenue" earned in a compliance period. This is done by measuring adjusted operating profits, which are determined by deducting allowable costs for the period from gross revenue from operations, against "target operating profits" that represent the maximum permissible profit for a compliance period. Interim pricing tests enable the supplier to monitor the level of his prices and profits from time to time during a compliance period.

For the unit-cost category, the Committee determined that the Regulations require the determination of a "base price" that is the price for which the product was being sold on or before October 13, 1975. If that price is not considered to be typical, the base price may be another price charged during the 30 days prior to October 13, 1975. As well, the Regulations required an estimate of "base cost" that is the best estimate of allowable costs per unit on October 13, 1975, made on the basis of the latest cost information. Finally, the Regulations require a calculation of "current costs" that are the supplier's best estimate of allowable costs per unit of production as of the date when a price adjustment is required. The estimate is to be based upon the latest available cost information and may include an anticipated cost increase that is reasonably certain to occur.

The maximum price per unit that may be charged cannot exceed the base price plus any excess of the current cost over the base cost. In essence, a supplier may only increase prices to directly cover increased allowable costs since October 13, 1975.

The interim pricing tests under the net-margin rules require the control of prices in a manner which ensures that on a cumulative quarterly basis throughout the compliance period, the gross revenue from operations does not exceed a targeted gross revenue amount calculated by applying the target net margin concept. The targeted gross revenue calculation is:

$$\frac{\text{Allowable costs}}{100\% - \text{target net margin percent}}$$

The Regulations provide tests that are intended to establish whether profits from the compliance period exceed those permissible under the program. Exhibits 4 and 5 illustrate the general flow of these Regulations.

The strict interpretation and application of the Regulations is subject to numerous difficulties, and an attempt to apply them to Ontario Hydro significantly compounds the problems. The Committee noted that the broad thrust of the Anti-Inflation Program was to "restrict profit per unit of output, in dollar terms, to a firm's average per unit profits experienced prior to [October 14, 1975]." Essentially the general principle was stated in the Policy Statement to be one where:

> "Increases in prices should be limited to amounts no more than required to cover net increases in costs... Firms which are able to allocate costs to individual products are expected to increase prices of these products by no more than increases in costs allocated to this product... If a firm finds it impossible to allocate costs to individual products, it should price its products in such a way as to leave its percentage pre-tax net profit margins no higher than 95 percent of its average percentage pre-tax net profit margin in the last five completed fiscal years."

The Committee concluded that it was most appropriate to monitor Ontario Hydro rate increases in relation to these general principles. For the reasons stated above, it did not believe it necessary to calculate strictly in accordance with the Regulations the maximum price increase allowable for Ontario Hydro. Rather, it relied upon the same approach that it had taken in its interim report.

In doing its unit-cost calculations, the Committee began by attempting to estimate the cost of the product on or near October 13, 1975. The Committee determined that Hydro can only allocate costs to its product on a reasonable basis and consistent with its usual accounting practices if it does so over the entire one-year period for which a single rate structure was in effect. It was considered inappropriate to use a cost estimate made on any one day near October 13, 1975, or in fact, any cost estimate made from January 1, 1975 to October 13, 1975. To estimate the cost of the product prior to October 13, 1975, therefore, the Committee considered that the closest appropriate time span was the period between January 1, 1974 and December 31, 1974.

Since Hydro is a firm that sets prices that will be in effect for some period of time ahead, the Committee recognized the necessity of allowing increases on the basis of forecasts of cost increases. The Committee was satisfied that Hydro's forecasts of cost increases were based on known changes, or changes that are reasonably certain to occur within the period in which the price is expected to remain in force. The Committee did not, however, require Ontario Hydro to recast its latest 1976 forecast to provide for the effect the Anti-Inflation Program would have on it. The only reason the Committee did not require a new 1976 forecast was that in the areas in which the Regulations could reasonably be expected to affect the 1976 forecasts, the escalation factors used by Hydro were lower than the inflation factors implied by the Regulations.

The Committee's calculations of the maximum increase for Ontario Hydro following the general intent of the unit-cost approach allowed an increase of approximately 31 percent (Exhibit 6). The Committee calculation of the maximum rate increase for Hydro following the general intent of the net-margin approach allowed an increase of approximately 31 percent as well (Exhibit 7).

The Committee noted with some concern that the application of the general intent of the Anti-Inflation Program did not contain the largest rate increase in the history of Ontario Hydro.

The Committee recommends that:

IV-2 THE ONTARIO GOVERNMENT ENSURE THAT THE MAXIMUM PERMISSIBLE INCREASE UNDER THE INTENT OF THE ANTI-INFLATION PROGRAM NOT SERVE AS THE ONLY CONSTRAINT ON FUTURE BULK POWER RATE INCREASES.

In conclusion, it is the view of the Committee that the Anti-Inflation Regulations do not and should not apply directly to Ontario Hydro. Furthermore, in light of the difficulties in interpretation and application of the Regulations, and the fact the Memorandum of Agreement specifies that they do not apply, the Committee did not consider that it was necessary to attempt to utilize strictly particular detailed sections of the Regulations. Rather, to determine whether in the opinion of the Committee, the 22 percent rate increase is in keeping with or supportive of the Anti-Inflation Program of the Government of Canada and the Ontario commitment to that program, the Committee examined the increase in relation to the broad thrust of the program. The Committee concluded that a rate increase of 22 percent did not violate its spirit and intent.

As the Committee's investigations were drawing to a close, a federal budget was presented that indicated some changes were being made in the Regulations. As well, the Supreme Court of Canada had just concluded a hearing questioning the constitutionality of the Anti-Inflation Act and Regulations as well as the validity of the Ontario Government's approach to giving the Federal Anti-Inflation Board power over public employees in the Province. Neither of these later developments is included in this report.

CHAPTER IV-2

DETERMINING THE REVENUE NEEDS IN 1976

While the Anti-Inflation Program will not constrain Hydro's proposed bulk power rate increase, the increase is affected by Hydro's obligation under the Power Corporation Act to supply power at cost. The Committee briefly examined each component of Hydro's costs prior to issuing its interim report recommending that Hydro reduce the rate increase to 22 percent from the proposed 25 percent level. The costs were analyzed in three categories: energy variable costs; operations, maintenance and administration costs; and capital costs. The costs were then related to Hydro's forecast of sales volume, and to revenue from secondary and direct retail sales, to determine the revenue needed from the bulk power sales. With a forecast of the volume of bulk power sales, the unit revenue increase could be calculated.

The same basic format is followed in this chapter, in which the Committee concludes that Hydro's current estimates of energy variable costs are reasonable; operations, maintenance and administration costs can be reduced slightly from the forecasts, and procedures for controlling these manageable expenditures should be tightened; capital charges should be related to the overall financial integrity targets; and Hydro's overall needs for revenue in 1976 make it impossible to reduce the rate any further.

In the sections that follow, the Committee will deal with each conclusion, relating the forecast of costs made by Hydro to the Committee in 1975 before the interim report to its most current estimate.

FORECASTING ENERGY VARIABLE COSTS

Hydro's four major categories of energy variable costs are shown in the table below.

	($Million)		
Energy Variable Costs	1975 Forecast	Current Forecast	Difference
Fuel for generation	403	368	- 35
Power purchased	76	73	- 3
Nuclear agreement charge	33	31	- 2
Water rentals	16	16	
	528	488	40

These energy variable costs are discussed in this section according to the degree of change in Hydro's forecast.

The forecast cost of water rentals is unchanged. These payments are made by Hydro to the provinces of Ontario and Quebec and the Federal Government for rights to develop and operate leased water-power sites. The monies paid to Ontario and Quebec are based on the average annual horsepower equivalent to the annual net energy generated, and the monies paid to the Federal Government on the use of water. Hydro also pays minor amounts for water storage facilities and the operation and maintenance of control dams. In effect, water rentals are a charge on Hydro, with most of the proceeds flowing back into the treasury of the Province of Ontario. The lack of change in forecast cost indicates that Hydro will continue to use the hydraulic stations it is now operating to their maximum potential and that there is no change in its estimate of water flows. The Committee was concerned whether it was appropriate to tax electric users in this way.

The Committee recommends that:

IV-3: THE ONTARIO GOVERNMENT RECONSIDER THE APPROPRIATENESS OF CHARGING ONTARIO HYDRO FOR WATER RENTALS AT HYDRO'S HYDRAULIC GENERATING STATIONS.

The nuclear agreement charge arises from the financing of the Pickering generation station. Ontario Hydro, Atomic Energy of Canada Limited, and the Province of Ontario were parties to a joint undertaking for the construction and operation of the first two units at the Pickering Generating Station. Commencing with the in-service date of each of the units in 1971, Ontario Hydro is required to make payments for 30 years to each of the parties in proportion to their capital contributions. These payments, termed "payback," represent in a broad sense the net operational advantage of having power generated by Pickering Units 1 and 2 as compared with coal-fired units similar to Lambton Units 1 and 2.

The Committee was concerned about nuclear agreement costs as well as the water rentals. At a time when the federal and provincial governments are both apparently committed to the objective of overcoming inflation, it seemed inappropriate for government charges to be contributing to Hydro's historic rate increase. Hydro reported that its attempts to renegotiate these charges failed to achieve any changes.

The Committee recommends that:

IV-4 ONTARIO HYDRO CONTINUE TO RENEGOTIATE THE NUCLEAR PAYBACK AGREEMENTS TO REDUCE THE ANNUAL PAYMENTS TO ATOMIC ENERGY OF CANADA LIMITED AND THE PROVINCE.

Power purchased comprises the cost of primary and secondary power and energy purchased from interconnected utilities within and outside the Province of Ontario. Power flows in both directions between Ontario Hydro and other utilities to meet mutual system needs. Power flowing into Ontario is reflected as power purchased, and power flowing out of Ontario is reflected as secondary power and energy sales. Hydro enters into firm purchase agreements when neighbouring utilities have surplus power available for sale at advantageous prices. The major sources of power purchased are Hydro-Quebec, Atomic Energy of Canada Limited (from Douglas Point Generating Station), and Manitoba Hydro.

The most significant component of energy variable costs is fuel for generation. Fuel costs consist of the cost of fuel used in Ontario Hydro's fossil-electric and nuclear-electric generating stations and include the delivered cost to each station of coal, ignition and combustion turbine oil, gas, uranium and steam. Fuel is charged to operations at the average cost per unit of fuel used. In any given year, coal may represent 55 to 60 percent of the total; oil may represent about 12 to 14 percent; gas may represent about 16 to 18 percent, with the remainder - approximately 10 percent - being uranium.

The cost of coal and oil, representing nearly 90 percent of the total, can be forecast for the next year with a relatively high degree of accuracy. This is because these fossil fuels tend to be stockpiled during the summer (especially coal), while navigation is open and the daily demand for electrical energy is low. In the winter, as the demand increases, more generating stations that burn coal or oil are brought into operation, depleting the coal and oil inventories. Since the fuel expenses are charged to the cost of power when the fuel is burned - not when it is stockpiled - the unit cost of the winter fuel is well known by the end of the preceding summer. The only significant variable is the amount of fuel that will be burned, and that depends on the pattern of demand for electrical power. Since the fossil-thermal generating stations are used to generate power only after Hydro has maximized its supply of power from power purchases, hydraulics, and nuclear capacity, and since the least efficient fossil burners are used last, variations in demand have a significant impact on the amount of fuel burned. Hydro reduced the estimate of 1976 coal costs made in the summer of 1975 (and confirmed later in the same year) by $35 million, or about 8 percent, when it made estimates again in March 1976, reflecting a new forecast that the demand for electric power will be about 4 percent lower than it had previously anticipated. Thus, despite the fact that the cost of fuel in the forecast is almost unchanged from the earlier level (Exhibit 8), Hydro was able to reduce its total estimated fuel cost by that amount.

Overall, the Committee believes that the current estimate of energy costs is reasonable.

TIGHTENING UP ON OPERATIONS, MAINTENANCE AND ADMINISTRATION

Operations, maintenance and administration (OM&A) costs encompass the tremendous variety of costs incurred in operating a huge electric power utility. They include such diverse costs as those associated with operating and maintaining generating stations, cutting trees around the transmission lines, billing and collecting accounts, purchasing everything from paper clips to nuclear fuel, and raising billions of dollars in Canadian and international money markets.

OM&A expenditures are currently budgeted to amount to some $376 million in 1976, with another $12 million being set aside for grants in lieu of municipal taxes as specified in the Power Corporation Act.

	($ Million)			
	1975 Forecast	Interim Report Basis	Presented to Committee	Final Forecast
Operations, maintenance & administration	345	345	369	376
Approximate municipal grant in lieu of taxes	12	12	12	12
	357	357	381	388

As shown above, this is about $31 million more than had been estimated by Hydro last summer, and confirmed by it in November. It is about $7 million more than the amount presented to the Committee in February when the budgets were reviewed. Hydro attributed the increase to more accurate information on the cost of various work programs and capitalization policies, offset slightly by the short-term savings from the later in-service date for the new Bruce nuclear generating station.

The Committee was very concerned about the size and growth of OM&A expenses. The 1976 budget of $376 million is about $70 million or nearly 22 percent higher than the 1975 budget (Exhibit 9). With increases over the next several years forecast to average better than 11 percent annually, OM&A expenditures will be in the order of half a billion dollars by 1980.

In its interim report, the Committee noted that time constraints had resulted in its being unable to scrutinize the OM&A forecasts in any detail. Subsequently, the Committee spent several weeks considering OM&A costs, and directed its attention to a careful analysis of Hydro's budgets and budgeting procedures. Each branch of Ontario Hydro was asked to justify and explain its budget to the Committee. Still, in an organization as large, complex and multifaceted as Hydro, a budget examination lasting only several weeks meant that the Committee had to limit the objectives of its investigations to an attempt to judge: first, whether the budgets and their increases were in line with the work load, or were out of control; and, second, whether the processes used to plan, budget and control costs were adequate to manage Hydro's organization. The Committee's conclusions in each of these two areas are presented below.

Reviewing the Current Budgets

In its examination of whether the 1976 OM&A costs appeared to be generally in line with the work requirements of operating, maintaining and administering Hydro's sizeable plant, the Committee found that: the increases appeared generally to be justified; their overall level seemed under control; and, the specific questions raised by the Committee were adequately dealt with.

First, the increases from 1975 to 1976 appeared, in a general sense, to be justified. Almost half the total increase was accounted for by inflation, affecting salaries, supplies and purchased services. Of the real growth (measured by staff increases), almost 90 percent was accounted for by the Operations Branch and the Regions and Marketing Branch. Almost 80 percent of the total OM&A budget is contained in the Regions and Marketing and Operations Branches (Exhibit 10).

The Operations Branch comprises four major divisions, Nuclear Generation, Thermal Generation, Power System Operations and System Maintenance, and accounted for nearly three-quarters of the apparent real growth. To a large extent, the increases in this branch were necessary to start up and operate the new generating and heavy water capacity scheduled to come on stream. Since small percentage deteriorations in the efficiency of thermal stations can cost millions of dollars, the increases did not seem unreasonable.

The Regions and Marketing Branch is responsible for maintenance activities, some construction or betterments, customer service and regional administration, and the operation of the hydraulic generating plants. This large branch accounted for about 16 percent of the apparent real growth based on its budgeted staff increase of 4 percent. An increase of this magnitude appeared in line with the 5 percent increase in retail customers, 3 percent addition to transmission lines and 1 percent growth in distribution lines.

Staff functions accounted for the remaining 11 percent increase. In total, Hydro budgeted for a 5 percent apparent real growth, with individual branch increases ranging from 1 to 14 percent. For the most part, the real growth appeared in line with the work load arising from increased generating capacity, the expansion of new capacity design and construction, and the growth of the distribution system.

Second, the overall level of expenditures appeared under control. In the short time available, the Committee could not attempt to establish a precise relationship between costs and work measures or engineering standards. What the Committee could, and did do, was to look for overall indicators of effective cost containment. In so doing, it found that Hydro's productivity has improved over the last several years. The staff of Regions and Marketing, for example, has grown less than 1 percent annually, while annual work load increases have been in the neighbourhood of 3 to 4 percent. Also, it was cautioned that significant cuts to the big spending branches that operate and maintain the generation and distribution plant could be counterproductive. Not only are outages expensive, but with an increasing emphasis on optimizing the current system, the efficient use of existing facilities is becoming more important. As well, it noted that Hydro compares well in areas where external services are readily available and efficiency can be compared. The Committee found evidence that in areas such as pension fund management, computer services, personnel recruiting, and printing, Hydro's internal capabilities cost it less than it would be required to pay for these services outside of the organization. Finally, Hydro was already pruning its budgets below the original forecast while the Committee's review was underway. Hydro cut about $13 million from the OM&A budgets and another $37 million from capital in response to the current period of overall restraint. Most of the internally oriented services - public relations, manpower planning, computer systems, personnel research - were significantly reduced by budget cutbacks.

Hydro's ability to respond satisfactorily to specific budget questions was the third indication that cost increases were not out of control. Although the Committee found that, overall, the budgets were in line with Hydro's work requirements, a number of selected budget items raised specific concerns. Hydro responded either by recognizing and acting upon the Committee's concerns - closing J. Clark Keith to save about $6 million over 2½ years, and cutting back the forestry program - or by justifying increases to the satisfaction of the Committee. The Research Branch, for example, was flagged for special consideration because it had budgeted for a 12 percent staff increase in 1976, significantly above the 7 percent trend. The increase turned out to be justified by the need for an enlarged research effort into environmental problems at the generating plants. Other exceptional increases that the Committee noted were in System Maintenance (16 percent), Systems Planning (14 percent) and Property (11 percent). The increases were a result of extraordinary losses incurred during the hiring freeze and the need to mount new programs.

After reviewing these findings, the Committee concluded that OM&A costs are generally controlled and that there is no justification for across-the-board cuts. Reductions will only come from the hard, continuous management task of seeking small improvements and minimizing cost increases. In this light, the Committee was concerned that Hydro had allowed the budgets to drift up some $8 million beyond the target level proposed to the Committee in January and against which the Committee was assessing the possibilities for further reductions. The effect of this upward drift is to more than offset the $2 million savings identified by the Committee (closing J.C. Keith and cutting back the forestry program) and the $3 million savings from deferring the start-up of the Bruce generating plant.

The Committee recommends that:

IV-5 ONTARIO HYDRO HOLD ITS OM&A BUDGETS TO THE TARGET LEVEL PROPOSED TO THE COMMITTEE IN FEBRUARY REDUCED BY THE DEFERRED START-UP OF BRUCE GENERATING PLANT, THE CLOSURE OF J.C. KEITH PLANT AND THE CUTBACK IN THE FORESTRY PROGRAM.

Improving the Budgeting Processes

The second area of the Committee's investigation of OM&A was the budget process. The conclusions reached in examining costs generally make it imperative that Hydro's budgetary planning and control processes be the best possible. The Committee was concerned to find that Hydro's budget process was seriously deficient.

The overall pattern of Hydro's budgeting process has several impressive features. The budget process has a sound orientation towards activities rather than resources, and the detail for which activities were accounted proved useful in identifying potential areas for cutbacks. The monthly reporting system, combined with the thrice-annual detailed variance review, appeared effective in controlling expenditures. Over the last three years, actual costs were within 1 to 2 percent of budget, and the variances were both favourable and unfavourable. Where work program budgets were limited in controlling the work of the Design and Construction, Research and Computer Branches because of their orientation toward projects, they were supplemented by project planning and control systems. In the Committee's opinion, these systems were well-designed and executed.

The Committee found evidence, however, that Hydro's budget process was deficient. While the budget process appeared sound in conception, the Committee's firsthand experience with its real application brought to light major shortcomings: the slowness of the process; the inadequate orientation to performance; and serious deficiencies in the capital allocation process.

First, the budget processes do not appear to be sufficiently responsive to Hydro's fast-changing financial environment. In the fall of 1975, the Corporate Office asked the Branches for major cutbacks to their 1976 budgets in response to the Provincial Treasurer's directive to reduce Hydro's OM&A costs. Four to five months later, at the end of the Committee's sessions on budgets in February 1976, a clear budget incorporating the cutbacks and explaining the reasons for the large increases over 1975 in comprehensive and meaingful terms was still unavailable. The conclusion of the Committee is that the cumbersome procedures involved in preparing the budgets rather than the performance they are intended to highlight appear to have become an end in themselves.

Second, the budgets fail to highlight performance. The budgets did not tie costs and their year-to-year changes to planned work loads and performance. There were no indications whether productivity was increasing, real costs were being cut, or a more efficient use of plant was being planned. Without a clear definition of the relationship between costs and performance, the Committee seriously doubted whether the budgets were effectively supporting Hydro's commitment toward improving costs.

Finally, and probably of greatest importance, significant improvements are needed in Hydro's capital budgeting process. The Committee noted the low value assigned to the use of capital, the absence of clear and consistent criteria in use among the branches to justify capital expenditures, and the dependency of the Corporate Office on the branches' screening procedures before exercising its own signing authority. Without clear policies towards capital expenditures, the Committee doubted that the Corporate Office could allocate capital to its most effective uses among the branches' competing demands. The Committee therefore determined that the Corporate Office should establish clear guidelines for capital expenditures, and exercise greater central control over the rationing of capital to projects proposed by the branches.

Thus, while the Committee has not concluded that a dramatic slashing of the OM&A budgets is warranted, it does have several important recommendations.

The Committee recommends that:

IV-6 ONTARIO HYDRO REDUCE THE HIGH LEVEL AND RATE OF GROWTH PREDICTED IN OM&A BUDGETS BY PUTTING NEW EFFORT INTO IMPROVING PRODUCTIVITY, CUTTING COSTS, AND INCREASING THE EFFICIENT USE OF ITS PLANT.

IV-7 ONTARIO HYDRO MODIFY ITS BUDGET PROCESS TO HIGHLIGHT PERFORMANCE AND TO MAKE THE TIMING OF THE PROCESS MORE RESPONSIVE TO THE CURRENT FINANCIAL ENVIRONMENT.

IV-8 ONTARIO HYDRO ESTABLISH CLEAR GUIDELINES FOR CAPITAL EXPENDITURES, AND PROCEDURES TO ENSURE THE EFFECTIVE CONTROL OF THE RATIONING OF CAPITAL TO PROJECTS

SETTING TARGETS FOR CAPITAL CHARGES

There are four components to the capital charges the Committee has examined. These are interest, depreciation, debt retirement and system expansion.

	$ Million		
Capital Charges	1975 Forecast	Committee Proposal	1976 Forecast
Interest	319	319	338 +19
Depreciation	169	169	161 - 8
Debt Retirement	86		87
System Expansion	72	109	- -82
Deficit	(17)		(60)
Net Income	$ 629	$ 587	$ 526

The interest expense charged to operations is that part of Hydro's total interest outlay that is not accrued to unfinished capital projects. For example, the 1975 forecast of $319 million shown above represented only about 57½ percent of the $555 million of actual net cash interest outlay on Hydro's total borrowing. The remainder, $135 million, is charged to capital projects on a formula basis.

The interest charge forecast is higher than the previous forecast, despite the fact that Hydro's overall borrowings have been reduced in 1976. Several reasons for this are summarized in the table below.

Major Causes of Increase in the Interest Forecast	
	$ Million
Interest rates higher than forecast (net effect)	+ 7
More borrowing at end of '75 and early in '76 (net effect)	+ 5
Changes in construction program (net)	- 3
Losses on sales of reserve investments	+ 3
Finalized lease purchase arrangements	+ 4
	$ + 16 million

Interest rates are higher in 1976 than was forecast. This has increased the cost of borrowing by about $9 million, with $2 million of that added expense offset by higher rates earned on Hydro investments.

In anticipation of tight capital markets later in 1976, Hydro borrowed unusually large amounts at the end of 1975 and early in 1976. Over the course of 1976, Hydro will be paying some $27 million more in interest than had originally been forecast. However, $22 million of this added expense is offset by the fact that Hydro is able to reduce forecast short-term borrowings and place temporary cash surpluses in short-term investments.

The smaller capital construction program reduces the base against which interest is capitalized, but the deferral of in-service dates also reduced the amount of interest that would have been charged to the cost of power this year.

The accelerated sale of debt retirement and stabilization of rates investments are expected to produce greater losses than had been anticipated. Finally, the lease purchase agreement for Hydro Place had not been included in the original forecast.

Depreciation is charged essentially on a straight line basis over the expected life of the plants. There is no charge for decommissioning old plants. The $8 million difference between the earlier and current forecast is accounted for by the later in-service date of the first unit of Bruce A nuclear station. This decreases the assets to be depreciated in 1976.

Depreciation is charged essentially on a straight line basis over the expected life of the plants. There is no charge for decommissioning old plants. The $8 million difference between the earlier and current forecast is accounted for by the later in-service date of the first unit of Bruce A nuclear station. This decreases the assets to be depreciated in 1976.

Debt retirement is a statutory obligation set out in the Power Corporation Act, and has been tradition in Hydro. Debt retirement is not a cost but a statutory appropriation of net income based on a formula that accumulates sufficient funds compounded at 4 percent to retire the outstanding debt in 40 years.

System expansion is a new, non-statutory appropriation. Bill 77 introduced in the Legislature in 1975 included a provision for making the system expansion charge a statutory appropriation. The Bill was not passed before the previous Parliament dissolved and has not been re-introduced. The system expansion charge is designed to justify an amount of net income or profit that is large enough to meet Hydro's standards of financial integrity. The current standard is a debt: equity ratio of about 80: 20 and sufficient earnings to cover current interest charges 1.35 times.

The entire issue of Hydro's capital charges is an extremely complex one. It involves an accounting charge for depreciation, a formula charge for interest, a statutory appropriation for debt retirement, and a non-statutory appropriation to ensure financial soundness. It is difficult to assess how the concept of "power at cost" can realistically be applied to this mix of charges and appropriations.

Additionally, the examination of capital charges brought the Committee into the area of Hydro's financial integrity and overall provincial financing. The Committee was told that reducing the amount of funds available for capital charges and appropriations would impair Hydro's financial integrity, and increase its needs at a time when capital availability is limited.

"Financial integrity" in turn will affect the amount of money the financial communities are prepared to lend to a borrower and the interest rate associated therewith. The lower the financial integrity, generally speaking, the less capital will be available to a borrower and the higher the cost of funds. While market reaction to eroding financial integrity may be gradual in the form of slowly rising relative cost of money, etc., it may also be more dramatic in the form of a derating. In this later case, capital availability and cost of funds may be substantially altered overnight.

Also, the Committee was advised that the "financial integrity" of Hydro and the Province is interdependent. On the one hand, Ontario Hydro depends on the high rating accorded the provincial guarantee.* Hydro could not possibly raise all the capital it requires - even at higher rates of interest - without the provincial guarantee. On the other hand, the Province's credit rating may be affected to some degree by Hydro's perceived financial soundness. Although the gross debt of the Province - including provincial guarantees - is relatively high, most of the debt has been incurred as a result of Hydro borrowings, and is considered "self-supporting." Such debt is invested in assets that earn sufficient money to pay the debt-service charges that have been incurred. As long as Hydro maintains a reasonable financial position, the debt of Ontario Hydro will continue to be regarded as "self-sufficient" by the financial community and not as an obligation of the provincial taxpayer. If, however, Hydro is perceived by the financial community as being financially unsound, at least some portion of the debt would then be considered the taxpayer's obligation. This could, under certain circumstances, result in the deterioration of the Provincial credit rating. A lower credit rating raises the possibility that Ontario Hydro and the Province will be unable to raise the capital they require; a lower credit rating assures that the cost of whatever capital is raised will be higher.

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* - For historic reasons, the Province borrows in its own name in New York and relends to Hydro on the same terms. In all other financial markets, Hydro borrows in its own name with the benefit of an unconditional guarantee by the Province.

The Committee's difficulty was not in understanding these relationships, but, rather, it was in trying to define the real limits to Hydro's needs for internally generated capital. The Committee considered many difficult questions. For example: was the Province's current concern with a possible deterioration of its credit rating related to Hydro's need for capital or was it entirely attributable to deficits that until very recently were steadily rising? Was the fact that Hydro's financial condition is already far more extended than that of an independent, shareholder-owned utility an indication that Hydro could extend its debt position to a level closer to that of Manitoba Hydro and British Columbia Hydro?

These questions seem unanswerable. In its interim report, the Committee took the approach that the appropriate measure of Hydro's financial integrity was the overall adequacy of the capital charges together, rather than any one of them separately. In addition, the Committee was concerned that it not risk the financial integrity of the Province, while it shrank the margin of investor protection by a small amount. As well, the Committee noted that Hydro itself did not consider the maintenance of the financial ratios at a given level in any one year to be an absolute necessity. By adopting a technique of smoothing rate increases over several years, and by cutting the system expansion charge in half in response to the Treasurer's urging that the rate increase be moderated, Hydro had shown that it could - for some period of time - live with a financial condition that is less than its ultimate standard.

At the same time, Hydro has stated that even this temporary reduction in financial integrity has significant risks attached to it - particularly if the credit position of the Province is simultaneously under review.

The Select Committee was able to draw one firm conclusion. The primary objective of the capital charges should be to maintain the financial condition of Hydro so that it does not contribute to a deterioration in the credit rating of the Province. The Committee's approach - given this conclusion - was to work out a measure of overall capital adequacy and set a standard for 1976. The measure used by the Committee was the cash flow coverage of actual interest (about $585 million); the specific measure, a ratio of 1.06 times. Based on that measure, Hydro's overall need for internally generated capital is about $620 million. Based on Hydro's standards, the overall need for capital is about $617 million.

Capacity Needs According to Hydro's Standard	
Actual interest charge	$338 million
Depreciation	$161 million
Debt retirement & system expansion to meet 1.35 times interest earned	$118 million
	$617 million

ESTABLISHING HYDRO'S NEED FOR BULK POWER REVENUE

	Revenue Needs for 1976 $ Million	
	Hydro's Capital Criteria	Committee's Capital Criteria
Energy Costs	488	488
OM&A (including municipal tax)	386	386
Capital	617	620
Revenue Needs	$1,491	$1,494

The table above sets out the range of Hydro's revenue needs in 1976. The energy costs are a repetition of Hydro's forecast for 1976. The OM&A cost is based on Committee recommendation IV-5 that Hydro not let its budgets slip beyond the target levels proposed to the Committee, while taking advantage of identified savings. The estimates for capital are set out above.

Thus Hydro appears to need about $1.5 billion in bulk power revenue. Of this amount, Hydro estimates that about $112 million will be recovered from secondary sales. About another $115 million will be recovered from Hydro's retail sales, leaving a need for bulk power revenue of about $1,260,000,000. Hydro's latest forecast, however, is that bulk power revenue will be less than this amount. In fact, it is currently forecasting bulk power sales of only about $1.2 billion. Thus Hydro's revenues will fall about $60 million short of the demonstrated need (Exhibit 11). In this context, the Committee cannot justify a further decrease in the bulk power rate.

The Committee recommends that:

IV-9 ONTARIO HYDRO CONFIRM FOR THE BALANCE OF 1976 THE BULK POWER RATE INCREASE OF 22 PERCENT RECOMMENDED IN THE COMMITTEE'S INTERIM REPORT.

CHAPTER IV-3

HYDRO'S REVENUE NEEDS IN PERSPECTIVE

In this part of the report, the Select Committee has reexamined its interim recommendation that lowered the bulk power rate increase for 1976 from 25.17 percent to 22 percent. It has concluded that it can find no justification for reducing the rate any further, and accordingly has recommended that the interim rate be confirmed for the balance of 1976.

Throughout the hearing, the Committee became increasingly aware of the extensive and significant impact of Ontario Hydro on the Province, and indeed, the country. It is a large, important public institution whose policies affect the social, economic and environmental milieu of many Canadians. This led the Committee to conclude that, despite the exclusion of Hydro from the jurisdiction of the Anti-Inflation Board, its rate increases must be considered within the general intent of the federal Anti-Inflation Act and Regulations.

When the largest rate increase in Hydro's history apparently fell within the spirit and intent of the guidelines, the Committee went further. It concluded that, in light of the effort to restrain inflation, Hydro's rate increase in 1976 must be kept to the lowest feasible level. This led the Committee to a close scrutiny of Hydro's need for revenue. Each component of costs was carefully scrutinized. Overhead (OM&A) budgets were cut back, energy costs were confirmed, and a minimum target for interest coverage was established for the year. Even so, the Committee had to accept, finally, that its interim recommendation reducing Hydro's bulk power rate by 3 percent from Hydro's proposal could not be further reduced. Ontario Hydro's most recent forecast indicates that revenues will fall about $60 million short of what the Committee determined the minimum revenue requirements to be for 1976.

Although the rate increase is very high, the Committee recognized, with some satisfaction, that its rate recommendation will have saved the electricity consumers of Ontario some $40 million in 1976 from what they might have paid under the rate levels recommended by the Ontario Energy

Board. In this, the concluding chapter of its report, the Committee will provide a longer term perspective on Hydro's need for increasing revenue, and consider the impact of one possible way of reducing the system expansion plan. In addition, the Committee will consider the impact of increases in bulk power rates on consumers, suggesting that the impacts be mitigated to the maximum extent possible.

PUTTING THE CURRENT INCREASE IN A LONGER-TERM PERSPECTIVE

Even with the reduction achieved by the Committee, Hydro's 1976 bulk power rate increase is its highest ever. On several occasions, the Committee was led to believe that high rate increases might become a regular annual requirement for Ontario Hydro. Therefore, it requested Hydro to provide it with a long-term projection of foreseeable cost increases. In this regard, as well, the Committee wished to measure the impact on rate increases of reducing the system expansion program.

Hydro provided the Committee with a general estimate of foreseeable cost increases for the next ten years. While the figures provided are not intended as official Hydro forecasts, they do indicate the general pattern of rate increases required to keep pace with Hydro's probable cost levels. Additionally, they include the assumption that the Committee's recommended approach to load management is followed where necessary, although Hydro has not, at this time, committed itself to the achievement of the Committee's targets.

As shown in Exhibit 12, Hydro is expecting a very high cost increase in 1977, followed by moderating increases that, by 1980, are consistently below 10 percent. As the Committee received this information just as the hearings were drawing to a close, it had neither the opportunity of examining all of the underlying assumptions, nor of considering all of its implications. It did, however, identify the two factors that appear to produce the forecast pattern of cost increases:

§ The new cost plateau. Over the last few years, Hydro has been shifting from a low cost base - relying mainly on hydraulic power plus low cost coal - to a higher cost base - relying mainly on thermal generation including high-cost fossil fuels. This shift has occurred at a time of record inflation and high interest costs. As inflationary pressures subside, the cost increases should moderate. And, as more of the Hydro system reaches the higher cost level, the cost increases in percentage terms will be smaller, although the cost increases in dollar terms will continue to be substantial.

§ Catch-up. A number of factors have contributed to a deteriorating financial condition. These include the failure to grant Hydro rate increases at the level it has requested, lower demand for electric power in the Province, secondary sales to U.S. utilities that are lower than forecast, unforeseen cost increases, write-offs from cancelling or deferring construction programs, and the attempt to smooth rate increases over three years and deficits over five. The projected cost increases assume a "catch-up" in the sense of attaining Hydro's financial integrity targets in 1977.

The Committee, in recommending that Hydro reduce its system expansion plans by managing demand and reducing reliability levels before adding new generation, was aware that the size and shape of the system expansion program ultimately determined the need for revenues. To illustrate the effect of a reduced system expansion plan, Hydro was asked to estimate the cost of power for the period to 1987, using the same assumptions as above, with one plant - generating station B at Bruce - eliminated. Three significant results of that analysis are shown in Exhibit 12. They are:

1. The impact of cancelling a plant is very small in the early years. The long lead times involved in constructing generating stations make it very expensive to cancel plants that are near completion. Some work has begun on every station planned to come into service in the next ten years. Therefore, cancelling any plant to reduce planned generation during this period will cost money. Only those plants that are scheduled to come into service towards the end of the period, Bruce B nuclear station and Wesleyville oil-fired station, could reasonably be considered for cancellation. In the first year, any saving will be offset by cancellation costs and write-offs. Later, in the 1980s, the savings become more significant.

2. The basic pattern of cost increases is unchanged by a cancellation. A very high increase is forecast for 1977, with increases falling below 10 percent by 1980, and continuing in the range of 3 to 6 percent through the '80s. Basically, Ontario Hydro is such an enormous corporation, with

such a large system expansion plan, that even the cancellation of a $3 billion plant has very little effect on the basic pattern of cost increases.

3. But the dollar saving from cancelling a plant is substantial. Although the saving appears insignificant in relation to the total Ontario Hydro system, the cancellation of a plant such as Bruce B could save the Ontario consumer over three-quarters of a billion dollars to 1987. Hydro's calculations show that savings will continue to accrue into the 1990s (Exhibit 13), at which time added costs start to appear. The added costs are a result of the possibility that cancelling a nuclear plant may cause Hydro to burn larger quantities of very expensive fossil fuels. Whether this in fact happens will depend on a great many factors - social, economic and technological - not accounted for in the calculations that will undoubtedly have more impact in 1990 than will the cancellation of a plant in 1976.

Because the expected high cost increase next year will not be altered even by cancelling a major plant, it will be more important over the next few years than ever before - and possibly ever again - that Hydro, the Government and the municipal utilities make every effort to moderate the impact of the high cost increase on the consumer (Exhibit 14).

EASING THE BURDEN ON THE CONSUMER

The bulk power rate is applied only to the relatively few direct industrial customers and to the municipal utilities. Most consumers of electric power buy from municipal utilities at prices that are set by, and unique to, each utility. The Board of Ontario Hydro approves the rate structures of each municipal utility. Under the Memorandum of Agreement signed by Ontario and Canada, jurisdiction for the direct application of the Anti-Inflation Act and Regulations to the municipal utilities was assigned to Ontario Hydro.

The Committee has, from its beginning, been deeply concerned about the impact of Hydro's bulk power rate increases on the consumer. In its interim report, the Committee "specifically hoped that the 1976 rate increase could be kept to a level that could be related to the increase in incomes allowable under the guidelines. The Committee, therefore, carefully considered the impact an increase in the bulk power rate would have on the typical municipal rate and on the typical residential customer." The Committee expects that Hydro will use its regulatory powers to contain municipal rate increases in much the same way as the Committee has approached Hydro's bulk power rate increase: applying the general intent of the guidelines; examining each component of cost; and, looking at the rates in a longer term perspective.

The Memorandum of Agreement gives Ontario Hydro a responsibility to apply the Anti-Inflation Act and Regulations to municipal electric rates. The Committee expects that Hydro will exercise that responsibility with diligence and care, applying, so far as possible, the intent of the Anti-Inflation Program. The Committee has noted, however, that the Anti-Inflation Act and Regulations could not contain Hydro's historical bulk power rate increases. It is probable that a similar latitude may emerge when the Regulations are applied to municipal rates. Therefore, it is the view of the Committee that Hydro must go beyond an application of the Act and Regulations to consider the municipal utilities' specific components of cost.

Hydro's regulatory authority gives it an obligation to consider the specific components of cost of each municipal utility to determine the validity of proposed retail rate increases. For example, about 75 percent of a municipal utility's costs are for the purchase of bulk power from Hydro. Some utilities practice load management techniques to keep the cost of their bulk power purchases as low as possible. This practice not only keeps customers' rates down, but can contribute to Hydro's new load management objectives. Hydro should vigorously promote activities of this nature. Other components of municipal distribution costs should be closely scrutinized to ensure that no unnecessary charges are being passed on.

Finally, Hydro should be looking at municipal rate requests in a longer time perspective. Looking over five years, Hydro is expecting very high cost increases, followed by considerably smaller and then progressively declining cost increases. If municipal utilities can delay their spending plans for a few years, they will avoid adding increased local costs to increased bulk power costs. In a few years, increased local costs could be added to bulk power rate increases of 6 percent or less.

The Committee recommends that:

IV-10 ONTARIO HYDRO EXERCISE ITS FULL REGULATORY AUTHORITY TO MINIMIZE THE IMPOSITION OF LARGE ANNUAL RATE INCREASES AT THE LOCAL LEVEL.

Exhibit IV-1

HYDRO COULD FALL UNDER ONE OF TWO BUSINESS CATEGORIES DEFINED IN THE ANTI-INFLATION REGULATIONS

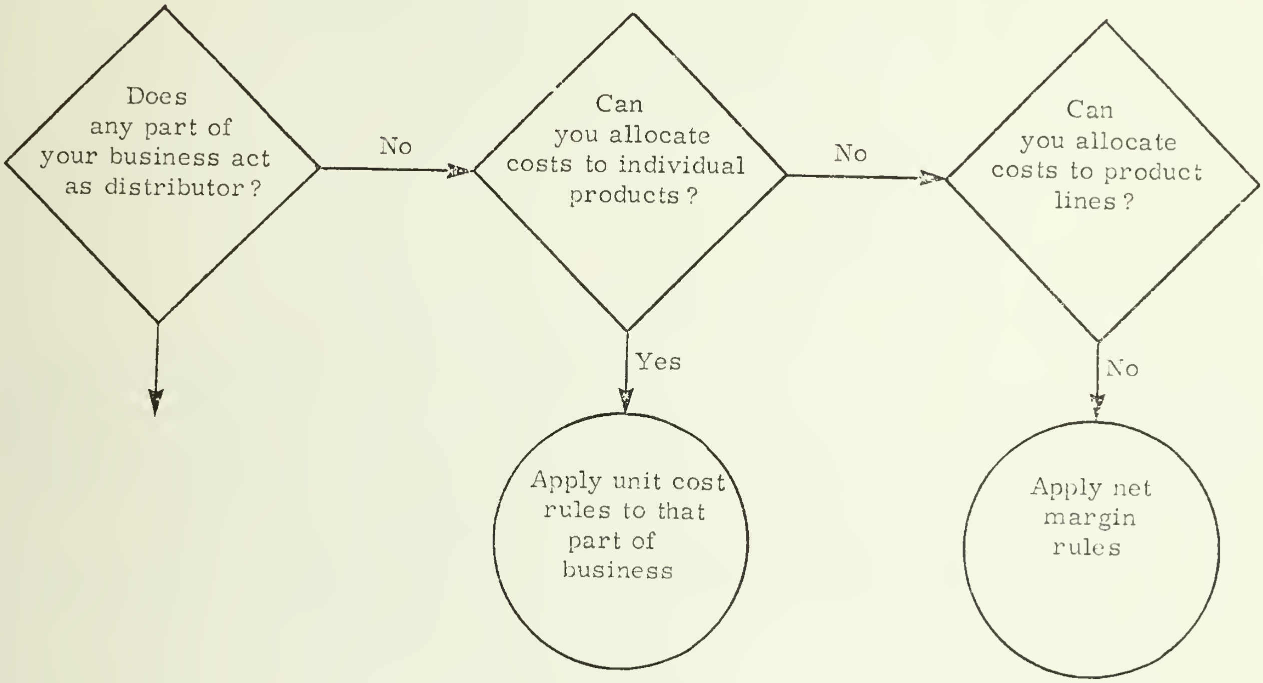

Does any part of your business act as distributor ?
No
Can you allocate costs to individual products ?
No
Can you allocate costs to product lines ?
Yes
Apply unit cost rules to that part of business
No
Apply net margin rules

Exhibit IV-2

THE DETERMINATION FOR BUSINESSES UNDER THE UNIT COST CATEGORY . . .

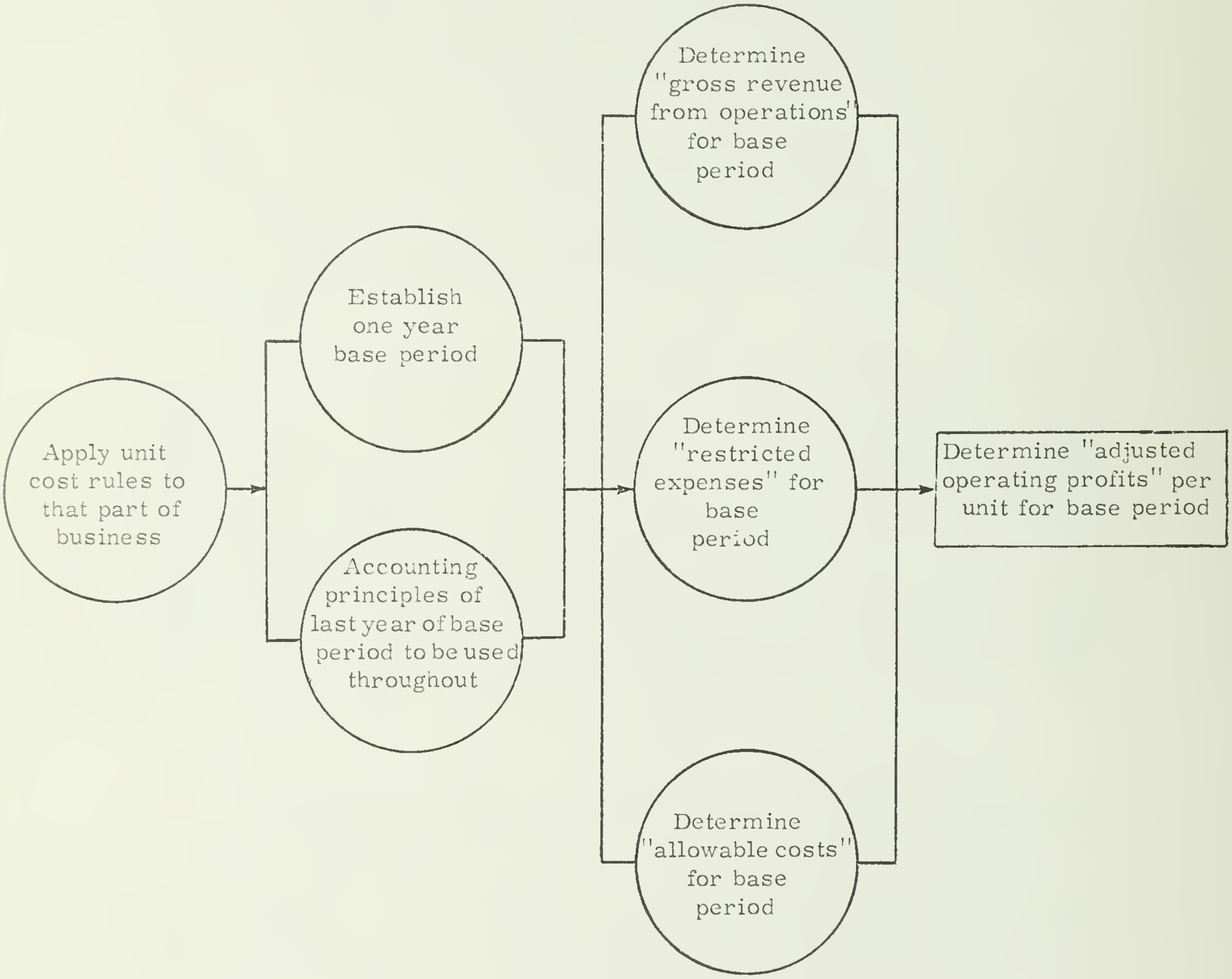

Apply unit cost rules to that part of business
Establish one year base period
Accounting principles of last year of base period to be used throughout
Determine "gross revenue from operations" for base period
Determine "restricted expenses" for base period
Determine "allowable costs" for base period
Determine "adjusted operating profits" per unit for base period

Exhibit IV-3

. . . IS VIRTUALLY IDENTICAL TO THE DETERMINATION FOR BUSINESSES UNDER THE NET MARGIN CATEGORY

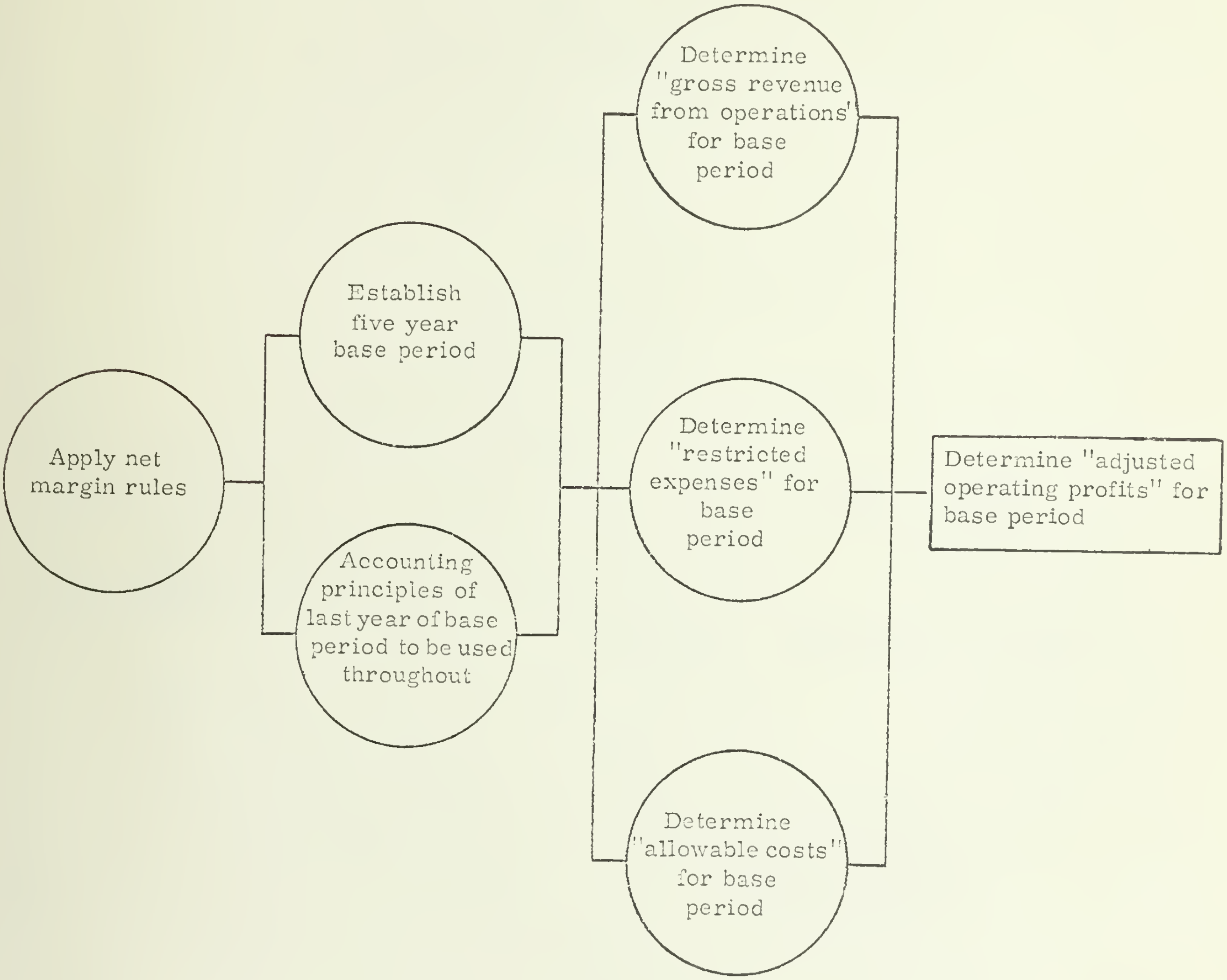
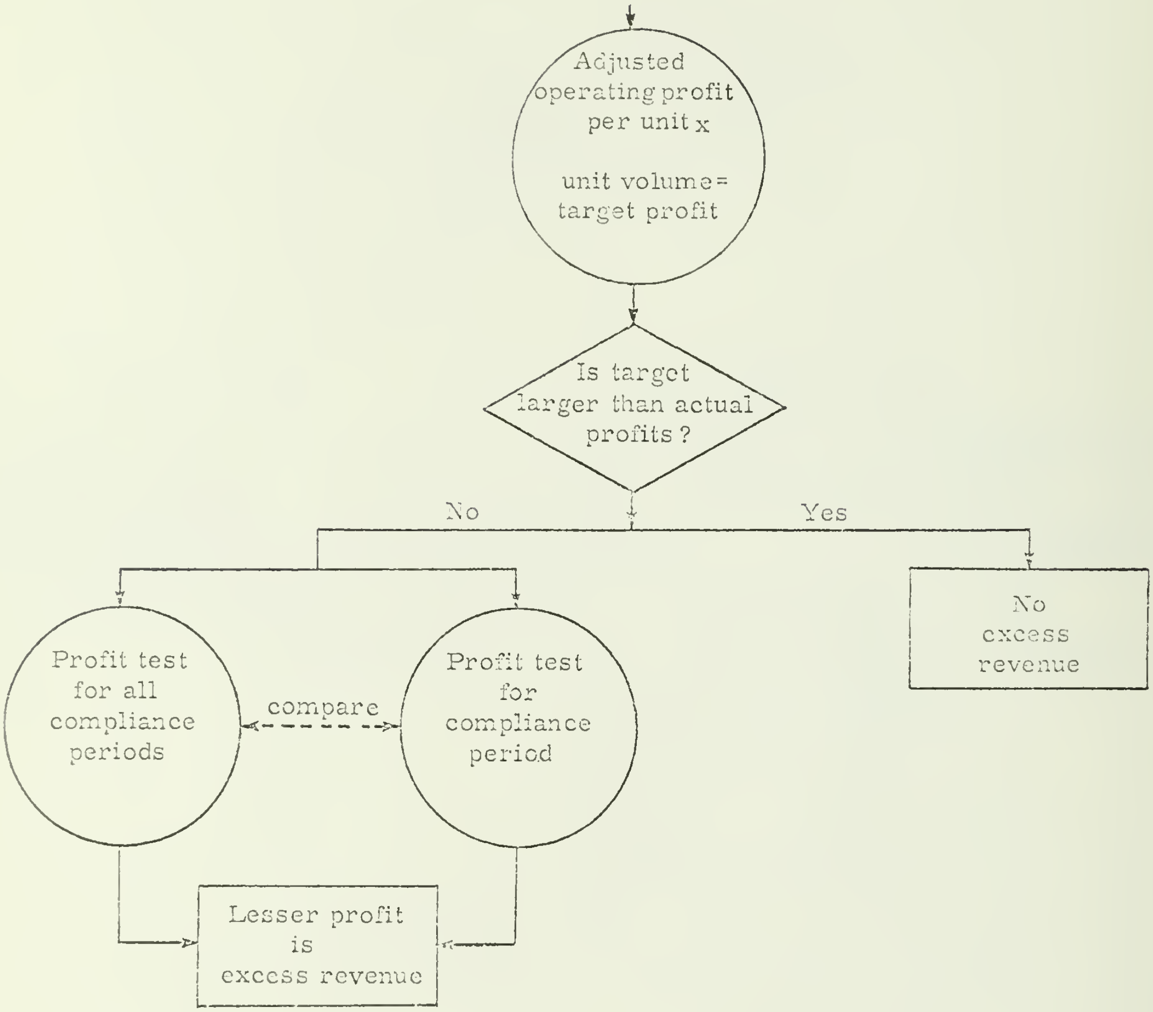

Apply net margin rules
Establish five year base period
Accounting principles of last year of base period to be used throughout
Determine "gross revenue from operations" for base period
Determine "restricted expenses" for base period
Determine "allowable costs" for base period
Determine "adjusted operating profits" for base period

Exhibit IV-4

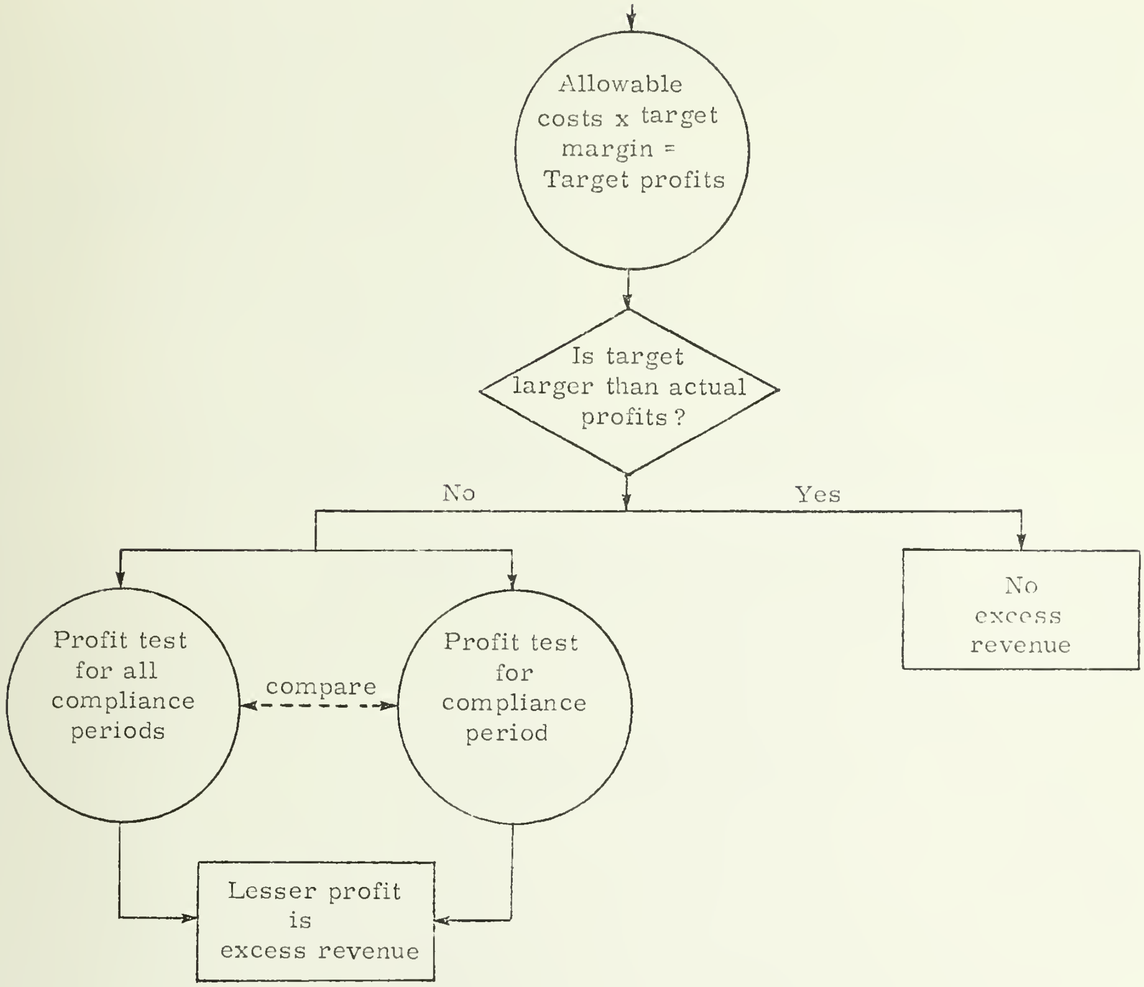
THE ESSENCE OF THE CONTROL TESTS IS TO RESTRICT THE GROWTH OF PROFITS ON A UNIT BASIS . . .



Adjusted operating profit per unit x
unit volume = target profit
Is target larger than actual profits ?
No
Yes
No excess revenue
Profit test for all compliance periods
compare
Profit test for compliance period
Lesser profit is excess revenue

Exhibit IV-5

. . . OR ON A TOTAL NET MARGIN BASIS



Allowable costs x target margin = Target profits
Is target larger than actual profits?
No
Yes
No excess revenue
Profit test for all compliance periods
compare
Profit test for compliance period
Lesser profit is excess revenue

Exhibit IV-6

THE ALLOWABLE RATE INCREASE UNDER THE UNIT COST METHOD IS 31% . . .

($ Million)

1974 BASE YEAR UNIT PROFIT	
Bulk power revenue	806
Bulk power cost excluding equity	687
Bulk power net income	119
Energy sold	78288000 MWH
Actual income per MWH	$1.52

1976 ALLOWABLE REVENUE	
Forecast energy consumption	85180000 MWH
Allowable net income at $1.52	129
Forecast bulk power costs excluding equity	1,173
Allowable revenue (forecast)	1,302

RESULTANT ALLOWABLE RATE INCREASE		
Rate Increase $\frac{1302}{994^{*}}$	=	31.0%

* 1976 revenue at 1975 rates (forecast)

Exhibit IV-7

. . . AND THE ALLOWABLE BULK INCREASE UNDER THE NEW PROFIT MARGIN METHOD IS 31.1%

BASE PERIOD PROFIT MARGIN

Average net profit margin

$$= \frac{\text{net income (1970-74)}}{\text{total revenues (1970-74)}} = 10.52\%$$

95% of net profit margin

$$= .95 \times 10.52 = 9.984\% \text{ or } 10\%$$

1976 ALLOWABLE REVENUE

	$ Million
Forecast bulk power costs Less forecast equity charges	1,173
Allowable revenue $= \frac{1173}{.9} =$	1,302

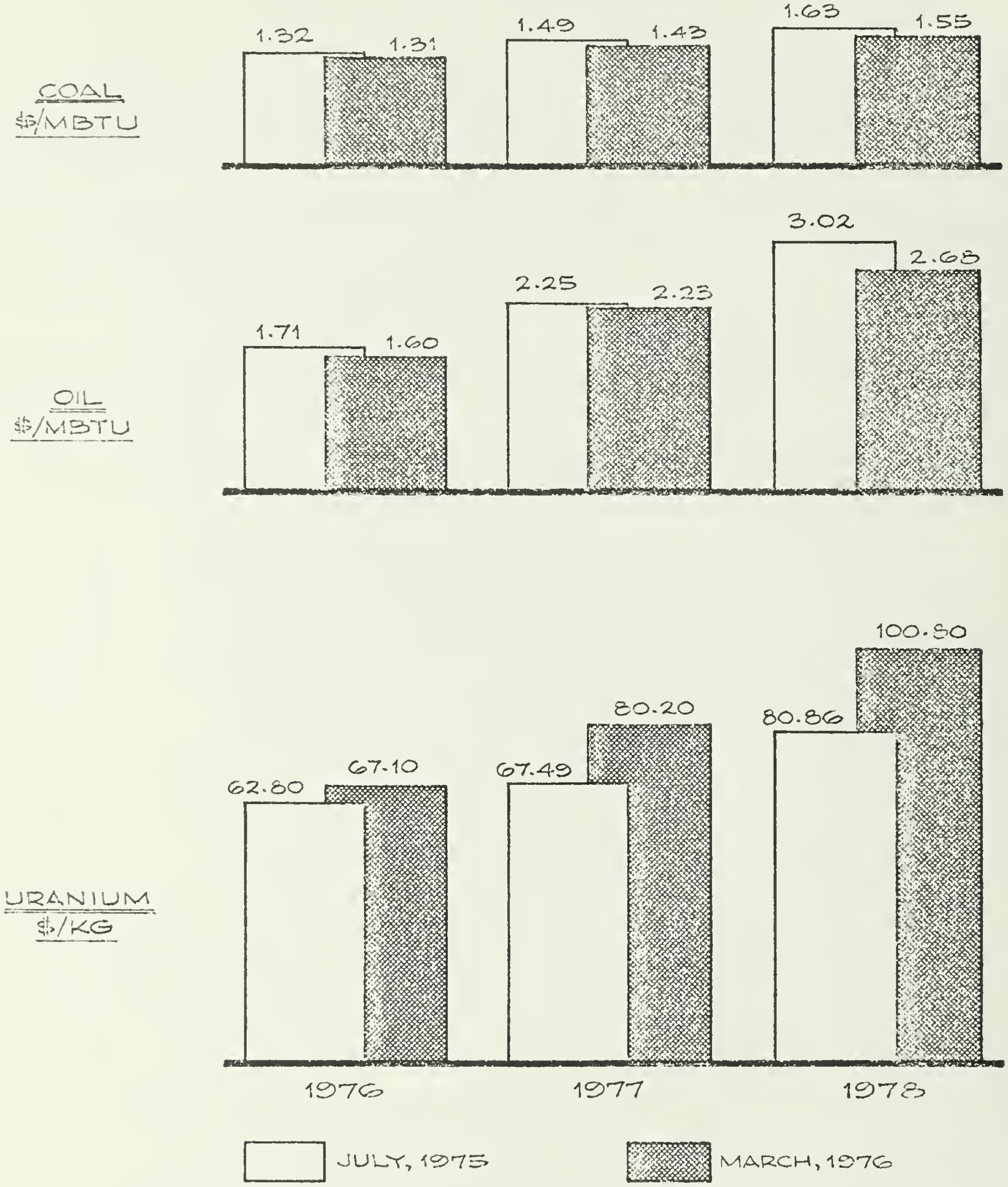
RESULTANT ALLOWABLE RATE INCREASE

$$\text{Allowable rate increase } \frac{1302}{994^{*}} = 31.1\%$$

* 1976 revenue at 1975 rates (forecast) = $994 M

Exhibit IV-8

HYDRO'S ESTIMATES OF THE COST OF THEIR MAIN FUEL PURCHASES - COAL AND OIL - HAVE GONE DOWN

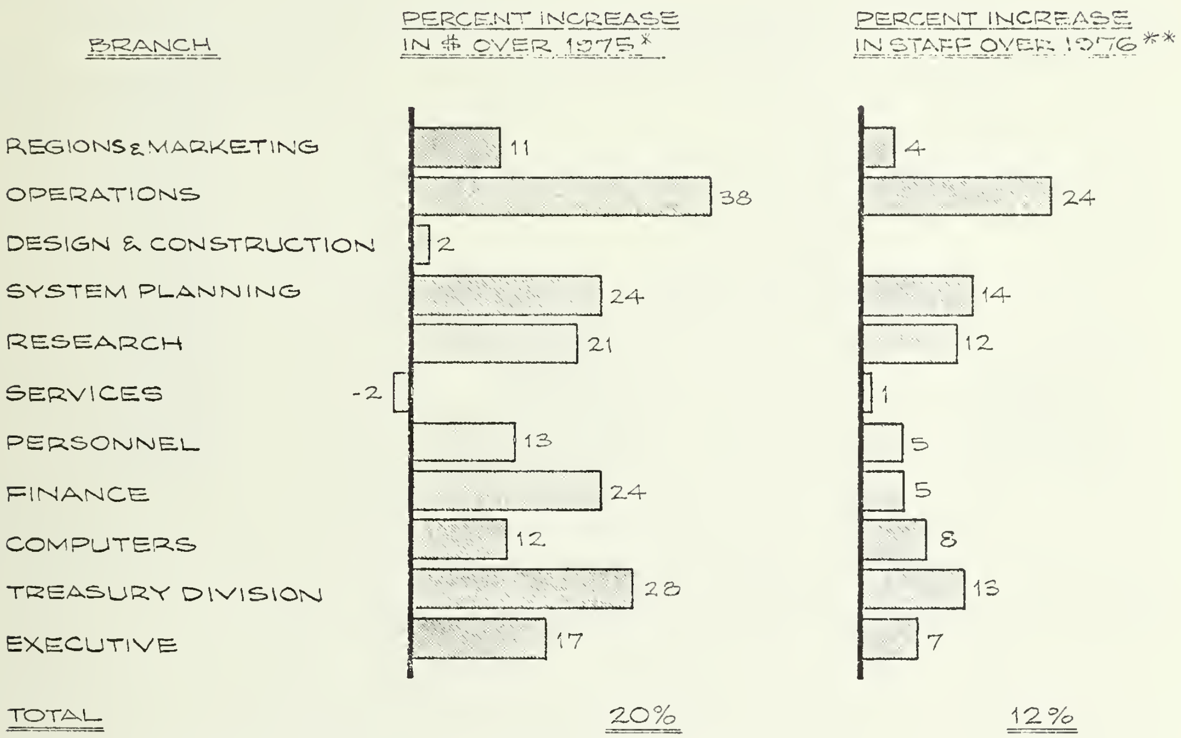


NOTE - ALL FIGURES FOR 1976-77-78 WERE FORECAST IN JULY, 1975 AND MARCH, 1976

SOURCE - ONTARIO HYDRO SUMMARY SUBMISSION

Exhibit IV-9

THE LARGEST INCREASE IN BOTH $ AND STAFF BETWEEN 1976 BUDGETS AND 1975 PROJECTIONS IS IN THE OPERATIONS BRANCH



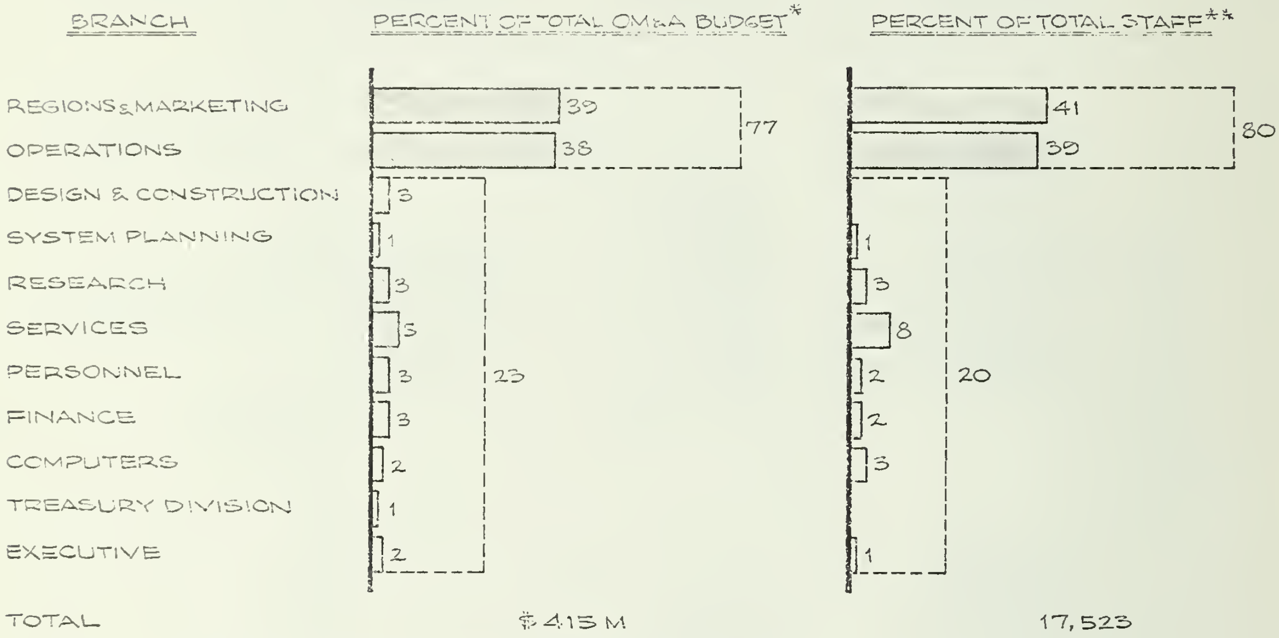
* INCREASES BEFORE COSTS CAPITALIZED TO OVERHEADS.

** DESIGN & CONSTRUCTION STAFF INCREASES ≈ 11% NOT RELEVANT TO OM&A BUDGETS.

SOURCE - ONTARIO HYDRO BUDGET SUBMISSIONS/ STAFF ANALYSIS.

Exhibit IV-10

ALMOST 80% OF THE TOTAL OM&A BUDGET IS CONTAINED IN THE REGIONS AND MARKETING AND OPERATIONS BRANCHES



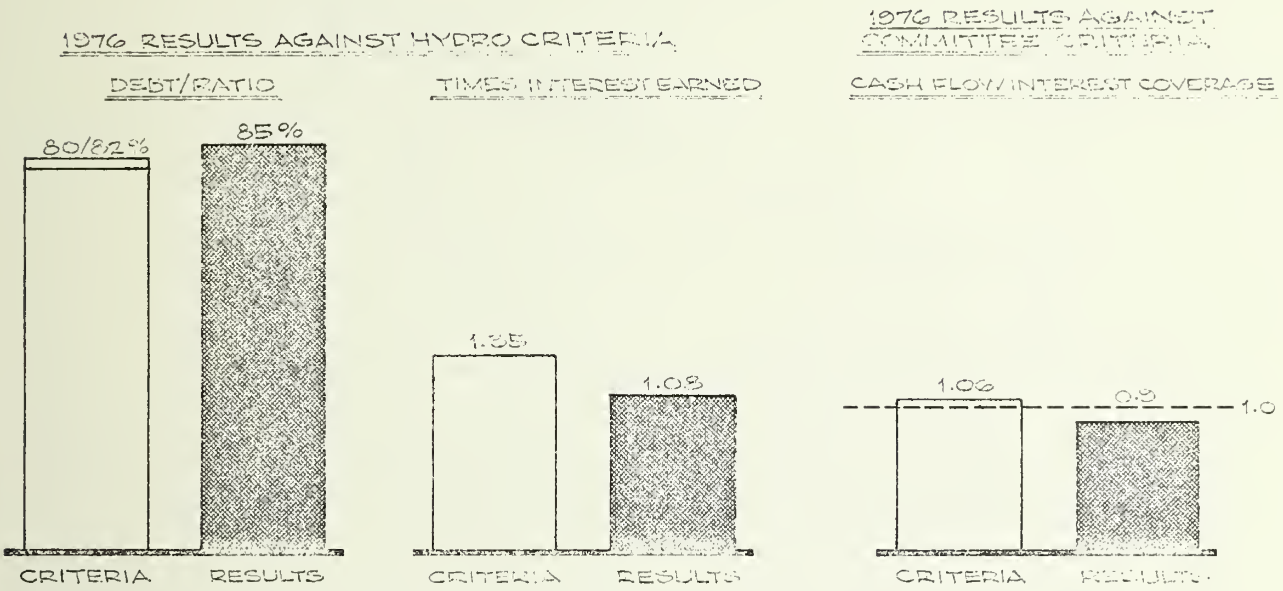
* OM&A BUDGET BEFORE COSTS CAPITALIZED AS OVERHEAD

** STAFF NET DESIGN & CONSTRUCTION STAFF SINCE MOST ARE WORKING ON THE CCP

SOURCE - ONTARIO HYDRO BUDGET SUBMISSIONS/ STAFF ANALYSIS

Exhibit IV-11

THE 1976 RESULTS WILL CAUSE A SIGNIFICANT DETERIORATION IN HYDRO'S FINANCIAL RATIOS

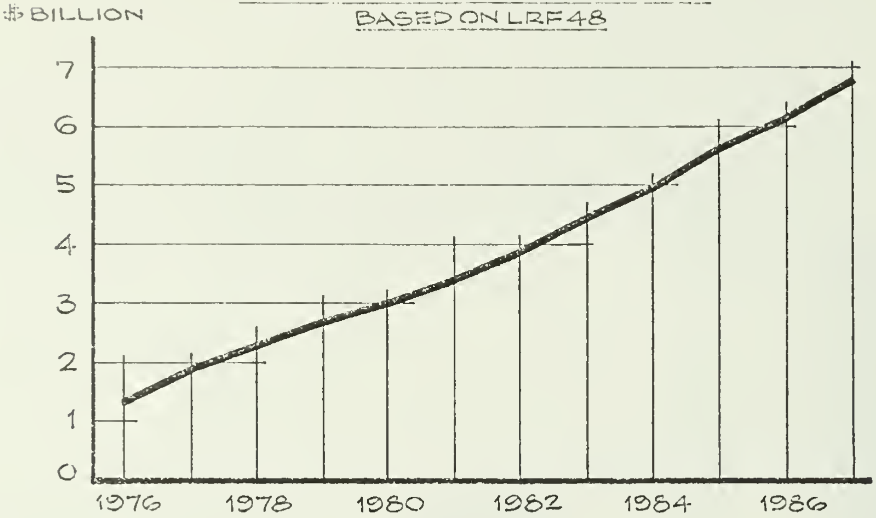


SOURCE - ONTARIO HYDRO SUMMARY SUBMISSION, EXHIBIT B-87.
STAFF ANALYSIS.

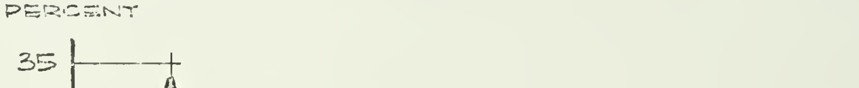
Exhibit IV-12

BY 1987, THE COST OF POWER IS FORECAST TO GROW FROM ABOUT $1¼ BILLION TO NEARLY $6 3/4 BILLION . . .

FORECAST TOTAL COST OF POWER
INCLUDING RETAIL DISTRIBUTION
BASED ON LRF48



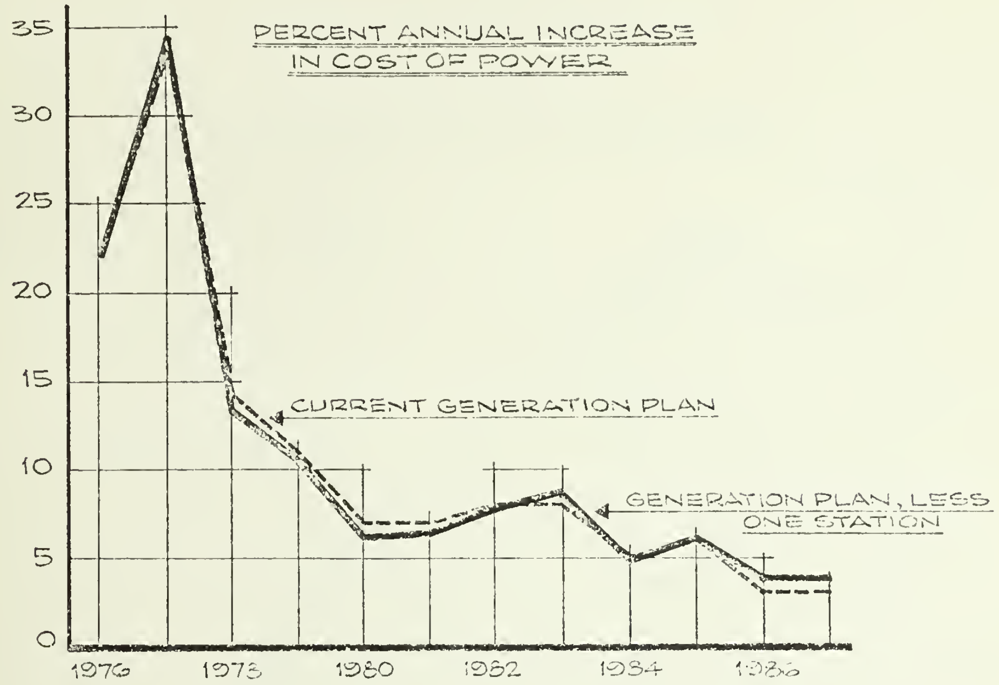
. . . ALTHOUGH THE PERCENTAGE INCREASES MODERATED SUBSTANTIALLY



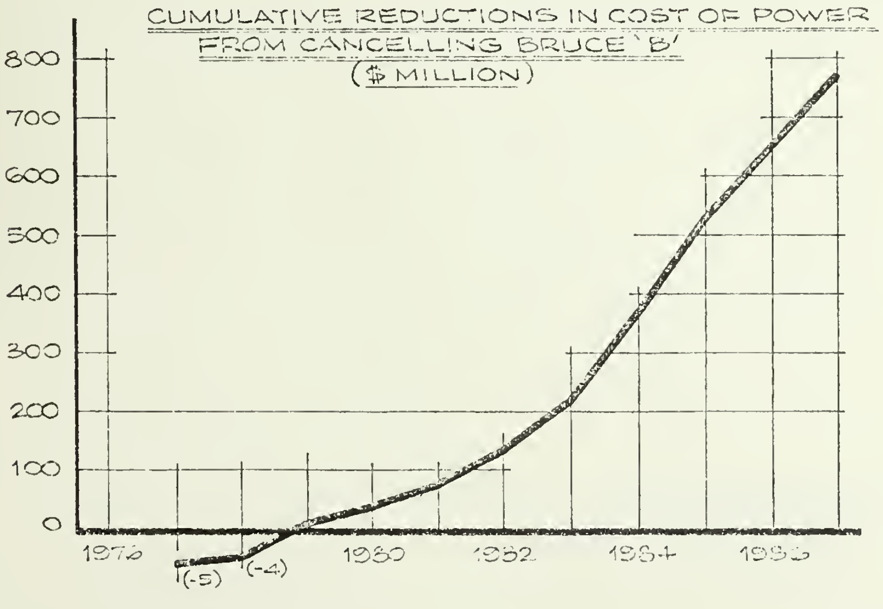
SOURCE - ONTARIO HYDRO EXHIBIT B-95

Exhibit IV-13

CANCELLING A LARGE GENERATION STATION DOES NOT CHANGE THE BASIC PATTERN OF COST INCREASES . . .



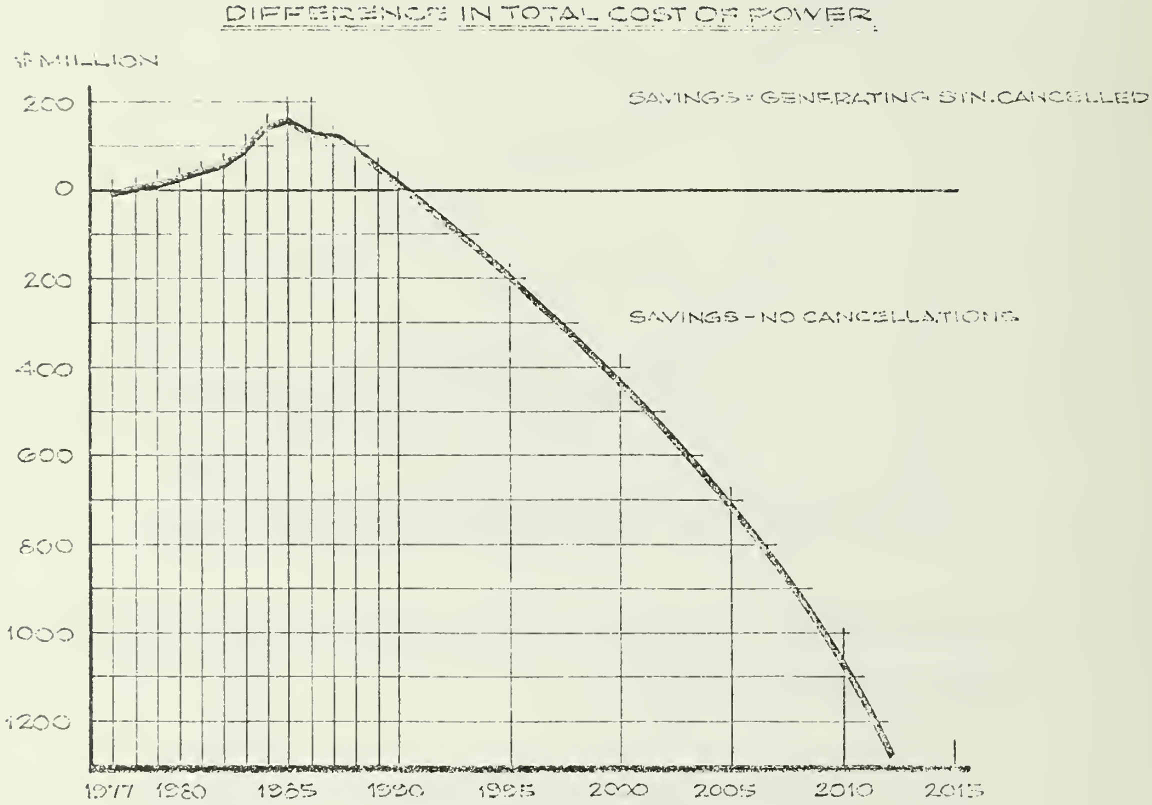
. . . ALTHOUGH THE SAVINGS ACCUMULATE TO OVER $3/4 BILLION DOLLARS IN TEN YEARS



SOURCE - ONTARIO HYDRO EXHIBIT B-95

Exhibit IV-14

CANCELLING A PLANT REDUCES THE COST OF POWER UNTIL 1990



SOURCE: ONTARIO HYDRO EXHIBIT B-94

Appendices

Appendices

TERMS OF REFERENCE

Ordered, that a Select Committee of this House be appointed to review Ontario Hydro's proposals to increase bulk power rates for 1976, together with the report of the O.E.B. to the Minister of Energy thereon under section 37a of The Ontario Energy Board Act, dated October 10, 1975, and such other information as the Committee may consider relevant for its purpose, in light of the anti-inflation program of the Government of Canada; and the Ontario commitment to that program; and to prepare and submit a report before the end of December 1975,* advising the Legislature whether in the opinion of the Committee, such rate increase proposals are in keeping with or supportive of the anti-inflation program of the Government of Canada and the Ontario commitment to that program; and consistent with Ontario Hydro's obligation to provide power at cost; and if not, to report to the Legislature, with its recommendations.

In carrying out its terms of reference the Committee shall have regard to the following factors:

- Current economic conditions;
- Recovery of additional operating costs;
- Dependence upon adequate electricity supply for Ontario's future economic well-being;
- Maintenance of Hydro's financial integrity;
- Any provisions of the said program respecting increasing energy prices,

and that the Select Committee have authority to sit during the intervention between sessions and have full power and authority to employ counsel and such other personnel as may be deemed advisable and to call for persons, papers and things, and to examine witnesses under oath and the Assembly doth command and compel attendance before the said Select Committee of such persons and the production of such papers and things as the Committee may deem necessary for any of its proceedings and deliberations, for which the Honourable Spearker may issue his warrant or warrants;

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* - later extended to May 31, 1976

and the said committee to be composed of the following twelve Members: MacDonald, Maeck, Peterson, Renwick, Williams and Wiseman.*

And the said Committee may request such coverage of its proceedings by Hansard and the printing of such papers as the Committee deems appropriate.

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* - During the course of Committee's hearings Messrs. Bullbrook, Peterson, Williamson and Maeck were replaced by Messrs. Eakins, Reed, McCague and Lane.

INTERIM REPORT

of the

SELECT COMMITTEE INQUIRING INTO HYDRO'S PROPOSED BULK POWER RATES

The Legislative Assembly of the Province of Ontario

FIRST SESSION: THIRTIETH PARLIAMENT

December 12, 1975

THE SELECT COMMITTEE INQUIRING INTO HYDRO'S PROPOSED BULK POWER RATES

THE LEGISLATIVE ASSEMBLY OF ONTARIO
FIRST SESSION: THIRTIETH PARLIAMENT

MEMBERS

Donald C. MacDonald, M.P.P., Chairman	York South
James E. Bullbrook, Q.C., M.P.P., Vice Chairman	Sarnia
Ian Deans, M.P.P.	Wentworth
Frank Drea, M.P.P.	Scarborough Centre
Evelyn Gigantes, M.P.P.	Carleton East
Larry Grossman, M.P.P.	St. Andrew-St. Patrick
Ray Haggerty, M.P.P.	Erie
Lorne Maeck, M.P.P.	Parry Sound
George McCague, M.P.P.	Dufferin-Simcoe
David Peterson, M.P.P.	London Centre
James A. Renwick, Q.C., M.P.P.	Riverdale
Douglas J. Wiseman, M.P.P.	Lanark

Counsel:	Alan M. Schwartz	Siegal, Fogler Barristers and Solicitors
Consultant:	James D. Fisher	The Canada Consulting Group
Clerk of the Committee:	Andrew Richardson	

TO: The Honourable Russell D. Rowe,
Speaker of the Legislative Assembly of the Province of Ontario:

Sir:

We, the undersigned members of the Committee appointed by the Legislative Assembly of the Province of Ontario on October 30, 1975, to review Ontario Hydro's proposals to increase bulk power rates for 1976, together with the report of the O.E.B. to the Minister of Energy thereon under section 37a of The Ontario Energy Board Act, dated October 10, 1975, and such other information as the Committee may consider relevant for its purpose, in light of the anti-inflation program of the Government of Canada; and the Ontario commitment to that program; and to prepare and submit a report before the end of December 1975, advising the Legislature whether, in the opinion of the Committee, such rate increase proposals are in keeping with or supportive of the anti-inflation program of the Government of Canada and the Ontario commitment to that program; and consistent with Ontario Hydro's obligation to provide power at cost; and if not, to report to the Legislature, with its recommendations, have the honour to submit the attached Interim Report.

Donald C. MacDonald, M.P.P.
York South,
Chairman

Donald C. MacDonald

James E. Bullbrook, M.P.P.
Sarnia

Ian Deans, M.P.P.
Wentworth

Frank Drea, M.P.P.
Scarborough Centre

Frank Drea

Evelyn Gigantes, M.P.P.
Carleton East

Evelyn Gigantes

Larry Grossman, M.P.P.
St. Andrew-St. Patrick

Ray Haggerty, M.P.P.
Erie

Raymond L. Haggerty

Lorne Maeck, M.P.P.
Parry Sound

David Peterson, M.P.P.
London Centre

James A. Renwick, M.P.P.
Riverdale

James. Renwick.

Douglas J. Wiseman, M.P.P.
Lanark

Douglas Wiseman

George McCague, M.P.P.
Dufferin-Simcoe

George R. McCague

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MEMBERS OF THE LEGISLATIVE ASSEMBLY

Your Committee begs leave to present its Interim Report.

RECOMMENDATION

It is the recommendation of this Committee that its term be extended from the end of December 1975 to March 31, 1976, in order to allow the Committee to fulfil its terms of reference in a responsible manner, but that as an interim measure, Ontario Hydro be allowed to increase its bulk power rate by 22 percent on January 1, 1976, subject to the conditions contained in this report. This rate recommendation should remain in effect until the date of the Committee's final report.

ACKNOWLEDGEMENT

The Committee wishes to acknowledge with deep appreciation the contribution to its work of the staff - Alan Schwartz, Counsel, James Fisher, Consultant, and Andrew Richardson, Clerk. Without their untiring effort, the Committee could not have completed its difficult task within the severe time limit under which it worked.

CONCLUSION

The entire Committee approached its responsibilities with a single objective: to find some way to reduce responsibly the rate increase proposed by Ontario Hydro. In the light of the anti-inflation program announced by the federal government, and the provincial government's commitment to that program, the Committee specifically hoped that the 1976 rate increase could be kept to a level that could be related to the increase in incomes allowable under the guidelines. The Committee, therefore, carefully considered the impact an increase in the bulk power rate would have on the typical municipal rate and on the typical residential customer.[1]

The anti-inflation guidelines, in their current form, provided the Committee with no assistance in meeting its objective. The guidelines do not appear to be meant to apply literally to a corporation such as Ontario Hydro. Even if the anti-inflation program was meant to apply strictly, the guidelines, as they currently exist, do not appear to be the appropriate mechanism with which to control Ontario Hydro's prices. The Committee has noted its concern that a strict application of the guidelines appears to allow Ontario Hydro to implement a rate increase of over 25 percent.

In the time available to it, the Committee could not adduce evidence that permits it to conclude that a simple re-evaluation of Hydro's forecast costs will result in a reduction. However, in keeping with the broad spirit

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1 - Ontario Hydro produces and transmits electric power to a variety of customers. It wholesales this power to 353 municipal utilities who are, in turn, responsible for the retail sale and distribution of it to commercial, industrial and residential customers. In addition, Hydro sells power in bulk directly to certain large industrial customers.

of the fight against inflation, the Committee concluded that a responsible interim rate reduction is justified. The recommended reduction must take into account the right balance between the fight against inflation and the short-term "financial integrity" of Ontario Hydro and the Province.

"Financial integrity", simply defined, relates to whether the financial communities are prepared to continue lending to Ontario Hydro and to the Province. The evidence before the Committee was that financial integrity generally does not erode slowly, but can disappear very suddenly. Also, the Committee was advised that the "financial integrity" of Hydro and the Province is interdependent. On the one hand, Ontario Hydro depends on the high rating accorded the provincial guarantee.[1] Hydro could not possibly raise all the capital it requires - even at higher rates of interest - without the provincial guarantee. On the other hand, the Province's credit rating is currently dependent on Hydro's perceived financial soundness. Although the gross debt of the Province - including provincial guarantees - is relatively high, most of that debt has been incurred as a result of Hydro borrowings and is considered "self-supporting". Self-supporting debt is considered to be debt invested in assets that earn sufficient money to pay the debt service charges that have been incurred. As long as Hydro maintains a reasonable financial position, the debt of Ontario Hydro will continue to be regarded as "self-sufficient"by the financial community and not as an obligation of the provincial taxpayer. If, however, Hydro is perceived by the financial community as being financially unsound, at least some portion of that debt would then be considered the taxpayer's obligation. This would likely result in the deterioration of the provincial credit rating.

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1 - For historic reasons, the Province borrows in its own name in New York and relends to Hydro on the same terms. In all other financial markets, Hydro borrows in its own name with the benefit of an unconditional guarantee by the Province.

A strong credit rating is a vital concern to both Hydro and the Province at this time. Each must come to the financial markets for substantial amounts of money early next year. A lower credit rating raises the possibility that Ontario Hydro and the Province will be unable to raise the capital they require in 1976; a lower credit rating assures that the cost of whatever capital is raised will be higher.

The Ontario Hydro forecast of internally generated capital for 1976 is $630 million. The actual net interest payable by Hydro in 1976, according to the latest forecast, will amount to $555 million. An immediate reduction of internally generated capital of $75 million might be seen, therefore, as leaving the lender with inadequate protection should there be any drop in the demand for electricity or any problems with operating costs.

In order to reduce the impact of the bulk power rate increase on the typical residential customer to 12 percent, a cut of 6 percent from the proposed rate is required. A cut of this magnitude would reduce Hydro's internally generated capital by about $63 million - virtually wiping out the entire interest coverage and leaving the lender with no protection against any drop in demand for electricity or any problem in operating costs. It is the view of the Committee that immediate action of this nature may have a serious, adverse effect on the financial strength of both Ontario Hydro and the Province.

In determining the bulk power rate for 1976, the Committee, in the final analysis, sought to balance the short-term financial integrity of Ontario Hydro and the Province with the spirit of the fight against inflation. It concluded that an immediate cut in the bulk power rate of three percent was appropriate. This cut will reduce Ontario Hydro's internally generated capital by about $31.5 million. At this rate, Hydro will fall far short of the level of interest protection currently deemed desirable by the financial community, but will be able to show some improvement over its very poor performance in 1975. In addition, the reduction will be seen by the financial community as a responsible one. It is an extraordinary measure being taken by a Committee that is prepared to continue its review of Hydro's operations so as to determine fully and responsibly Hydro's real needs.

The Committee's recommendation, at this time, is predicated upon Hydro covering its interest costs with a small margin of protection. The Committee is aware that a Treasury directive may result in Hydro's borrowings in 1976 being lowered by as much as $400 million. This should enable Hydro to project a lower level of interest charges for the coming year. The Committee expects Hydro to cut its rates by approximately one percentage point for each $10 million of projected savings. A reduction of borrowings of $400 million could, for example, justify a reduction in the rate increase of a further two percentage points.

The Committee has considered the impact a 22 percent increase in the bulk or wholesale power rate should have at the retail level. Taking the assumptions used by Ontario Hydro in Exhibit 13, filed with the Committee, the typical increase in the municipal rate attributable to the bulk power rate increase should be about 16.5 percent. The increase for the mythical, typical residential customer should, based on the assumptions upon which that customer is based, be 13.9 percent. The Committee noted that the reduction required to reduce the impact on the mythical, typical residential customer to 12 percent would result in a saving of approximately 30¢ per month for this customer over the Committee's proposed rate. The Committee concluded that the magnitude of the saving did not provide sufficient cause to risk putting Ontario Hydro or the Province in a position of being unable to raise needed capital in the period prior to its final report.

Finally, the Committee notes that the Board of Ontario Hydro has complete regulatory power over the rates charged by the municipal utilities at the retail level. The Committee expects that Hydro will use those powers to ensure that the municipal utilities operate within the spirit of the fight against inflation and will not, in 1976, attempt to improve their own relative financial conditions.

Dissent: Mr. J. Bullbrook (Sarnia) and Mr. D. Peterson (London Centre) regret that they are unable to sign the report of the Committee. While supporting totally the request of the Committee for an extension of its terms of reference to March 31, 1976, they feel that Ontario Hydro's bulk power rate should be lowered so that the increase in the average residential retail rate not exceed 12 percent.

I INTRODUCTION

Under the Chairmanship of Mr. D.C. MacDonald (York South), the Committee held 30 sessions to inquire into the proposed bulk power rate. The terms of reference of the Committee are included in this interim report as Appendix A.

On April 24th of this year, Ontario Hydro submitted a proposal to the Ministry of Energy for an increase of 29.7 percent for 1976. An important element in its new rate submission was a change in financial policy which allowed Hydro to recover deficits over five years and costs over three years, rather than in a single year. The effect of this change was to reduce the proposed rate from about 38 percent to the 29.7 percent request. Following the submission, new data and circumstances suggested that Hydro revise its proposal. A lower load forecast, significant reductions in secondary sales of interruptible power, revised forecasts of interest and cost escalations all contributed to a need to revise the original proposal of 29.7 percent slightly upward. Ontario Hydro, however, decided not to change the original proposal. Shortly thereafter, the Government's mini-budget, presented in July, included directives to Hydro to moderate its requirements. By cutting administrative costs, deferring the collection of deficits and cutting, in half, the system expansion charge for 1976, Hydro reduced its 1976 proposal to about 25 percent.[1] Following 55 days of hearings throughout the summer, the Ontario Energy Board recommended to the Minister that the rate increase be 26.7 percent for 1976. In so doing, the Energy Board confirmed that Hydro's cost estimates were reasonable and valid, and acknowledged the need for a system expansion charge.

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[1] - In accepting the lower figure, the Hydro board made it clear that it did not depart from its conviction that the 29.7 percent contained in the original proposal was fully justified.

In considering the Energy Board's recommendation, the Hydro board was confronted with a new uncertainty: the federal anti-inflation guidelines. The Hydro board believed that it was not possible to assess fully the impact of the guidelines while meeting the requirement of informing their direct industrial customers of the 1976 rate 60 days prior to implementation. Under the circumstances, the Hydro board decided to stay with a 25 percent increase for 1976. Early in its current session, the Legislature formed this Select Committee to inquire into Hydro's proposed increase in bulk power rates, in accordance with specific terms of reference.

Over the past five weeks, the Committee has met almost daily. Individuals and organizations responded to an advertisement by writing to the Committee expressing their views on the proposal. Each submission received has been acknowledged and entered in the record, with copies made and circulated to each member of the Committee and its staff. In addition, the Committee has heard from a great number of witnesses in the very short, five-week period of its existence. These are listed in Appendix B and fall broadly into two categories. On the one hand, the Committee heard from and questioned representatives of the Government, organizations and individuals who provided outside perspectives on Hydro and its place in the Ontario economy. On the other, the Committee requested and questioned evidence presented by Ontario Hydro on the specific areas of Hydro's operations that impact most directly and significantly on Hydro's bulk power rates.

The balance of this report will present the Committee's overall findings and conclusions on the application of the federal anti-inflation guidelines to Ontario Hydro and on the adequacy of Hydro's revenue and cost projections.

II ANTI-INFLATION GUIDELINES

In accordance with its terms of reference, the Committee reviewed Ontario Hydro's proposals to increase bulk power rates for 1976 in order to determine whether, in the opinion of the Committee, the rate proposals are in keeping with, or supportive of, the anti-inflation programs of the Government of Canada ard the Ontario commitment to that program. In so doing, the Committee had regard for both the guidelines for price and profits and the provisions of the program respecting increasing energy prices. In formulating its opinion, the Committee was acutely aware that neither the final form nor the content of the guidelines or regulations is known. All comments are, therefore, based on the White Paper itself, along with the accompanying Highlights Paper, and a subsequent further elaboration relating to "Regulated Industries and the Regulatory Process", to the extent that these can be interpreted in their initial wording.

The Committee has concluded that, at this time, it would be inappropriate to review Ontario Hydro rates within the strict meaning of the guidelines. Its conclusion is based on several factors. First, it is unclear whether the guidelines were meant to apply to a quasi-governmental Crown corporation whose rates are its main source of internally generated capital. Second, the structural policies in the guidelines relating to energy suggest that electric energy may be specifically exempt. Finally, the guidelines, as they currently exist, do not appear to be the appropriate mechanism with which to control Ontario Hydro's prices.

The provisions of the anti-inflation program respecting increasing energy prices state that:

> The situation in the energy field provides perhaps the clearest illustration of the difficult problems that must be overcome in finding and maintaining the right balance between a general policy of lowering the overall inflation rate and the need to permit an

> orderly upward adjustment of the relative prices of certain important products and services.

The Committee recognizes that the anti-inflation program envisages a "balance between a general policy of lowering the overall inflation rate and the need to permit an orderly upward adjustment of the relative prices of certain important products and services." In the opinion of the Committee, this suggests that for certain important products and services it would be inappropriate to apply strictly the guidelines for price and profits. Furthermore, the program recognizes that: "Major efforts are also required to develop and exploit energy supplies efficiently and to limit further increases in the real cost of energy in the future." The Committee is aware of the role the Ontario Hydro commitment to nuclear operations will play in this regard. It is evident to the Committee that the program clearly recognizes "the need for substantial upward adjustment in particular areas of the price structure if adequate new supplies are to be forthcoming." It must be noted, however, that the guidelines do not specifically identify the electric energy field; it may very well be that the electric energy field was not even contemplated. As well, the guidelines, to date, provide no assistance whatsoever in the determination of the "right balance."

In order to determine whether the rate proposal was "supportive" of the guidelines, the Committee specifically considered the guidelines for price and profits. In so doing, the Committee first assumed that Ontario Hydro falls within the description of a firm which is able to allocate costs to individual products. These firms are expected to increase the price of their product by no more than increases in costs allocated to the product. The guidelines, as they apply to these firms, state that:

> To compute the increase in costs which may be passed on, it will be necessary to estimate the cost of a product on or near

> October 14, 1975. A similar estimate of the cost of the product in question must be made at the date the selling price is to be increased. The difference between the two cost estimates is the maximum amount by which prices should be changed.
>
> The selling price is to be increased on January 1, 1976.

The guidelines recognize that: "Costs may vary considerably from day to day and many firms may not customarily compute their costs on a daily basis. Therefore, the two required cost estimates should be made on a reasonable basis, and both should be consistent with the firms' usual accounting practices."

Throughout its calculations, the Committee was aware of the definition of costs allowable for purposes of justifying an increase in prices. Specifically, both the debt retirement charge and the system expansion charge were treated as net income or profit and not as cost.

Ontario Hydro can only allocate costs to its product on a reasonable basis and consistent with its usual accounting practices if it does so over the entire one-year period for which a single rate structure was in effect. It was considered inappropriate to use a cost estimate made on any one day on or near October 14, 1975, or, in fact, any cost estimate made from January 1, 1975, to October 14, 1975. In order to accurately estimate the cost of the product prior to October 14, 1975, therefore, the Committee considered that the closest appropriate time span was the period between January 1, 1974, and December 31, 1974.

In considering the appropriate information, it was assumed that Ontario Hydro is a firm which sets prices which "will be in effect for some period of time ahead." Therefore, it could make increases in prices on the basis of forecasts of cost increases. The guidelines state that:

> These forecasts, however, should be based on known changes, or changes which can be expected to occur within the period for which the firms normally set prices in advance and which can be foreseen with a reasonable degree of assurance.

The Committee concluded that Ontario Hydro's forecasts of 1976 cost increases could be foreseen with a reasonable degree of assurance and could be expected to occur within the period of January 1, 1976, to December 31, 1976. The Committee did not, however, require Ontario Hydro to recast its 1976 forecast to provide for the effect the anti-inflation program would have on it. The Committee concluded that in the only areas in which the guidelines could reasonably be expected to affect the 1976 forecasts, the escalation factors used by Hydro were lower than the inflation factors implied by the guidelines.

In calculating the allowable increase in price which Ontario Hydro would be granted under this approach, the Committee was aware that the broad thrust of the guidelines would: "Restrict profits per unit of output, in dollar terms, to a firm's average per unit profits experienced prior to (October 14, 1975)." The calculation allows Ontario Hydro an increase of approximately 26 percent while remaining within this interpretation of the guidelines for price and profits.[1]

Since the Committee concluded that it was necessary to look to the period between January 1, 1974, and December 31, 1974, in order to estimate the cost of the Ontario Hydro product on or near October 14, 1975, it determined that, in relation to the applicability of the guidelines, Ontario Hydro might be considered a firm which is unable to allocate costs to individual products. This would result from a determination that the appropriate period is too remote from the contemplated date of October 14, 1975. In accordance with the guidelines, this type of firm ". . . should price

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1 - See Exhibit C

its products in such a way as to leave its percentage pre-tax net profit margin no higher than 95 percent of its average percentage pre-tax net profit margins in the last five completed fiscal years . . . The percentage net profit margin will be defined as profits divided by total operating revenue." The result of this calculation allows Ontario Hydro an increase of approximately 25.3 percent while remaining within this interpretation of the guidelines for price and profits.[1]

Finally, in this respect, the guidelines instructed regulatory agencies ". . . to use their powers over prices and the quality of service in order to ensure conformity with the program. The provincial governments are being asked to instruct their regulatory agencies to do likewise." An explanatory document released by the federal government stated that:

> It is proposed that the power to control price movements in the regulated industries continue to be vested in the regulatory agencies . . . With respect to the question of review under the anti-inflation program, it is proposed that the decisions of regulatory agencies operating under the delegation of guidelines should not be subject to direct Anti-Inflation Board review. They could, however, be made a direct subject of reference from Lieutenant-Governors-in-Council or the Governor-in-Council to the Administrator.

The Committee notes that Ontario Hydro's rates are reviewed rather than regulated by the Ontario Energy Board. However, the document states that: "The regulated industries comprise Crown corporations, utilities - publicly or privately owned - and corporations in the private sector." As the Committee is unaware of any publicly owned utility in Canada which is regulated in the narrow sense of the word, it considered that, for the broad purposes of the guidelines, a regulated industry may include any industry

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1 - See Exhibit D

whose prices are reviewed, in any manner, by a regulatory agency. Accordingly, the Committee examined Ontario Hydro's proposal in light of the explicit guidelines which regulatory agencies are to follow. These guidelines are as follows:

1. The general principle of increase in prices to amounts no more than required to cover net increases in costs should apply
2. Where regulatory agencies are required under their own legislation to provide for a "fair" or "reasonable" rate of return on capital and/or equity, this should be interpreted, for the purposes of the anti-inflation program, so as to ensure that regulated industries do not generate a larger proportion of their capital funds internally than has been their historic practices.

The Committee has concluded that the first principle clearly directs the regulatory agency to the broad thrust of the guidelines. While recognizing that Ontario Hydro does not fall within the strict application of the second principle, the Committee ascertained that Hydro will not, in fact, generate a larger proportion of its capital funds internally than has been its historic practice.[1]

In conclusion, it is the view of the Committee that the anti-inflation guidelines are not meant to apply literally to a corporation such as Ontario Hydro. Even if the anti-inflation program is meant to apply strictly, the guidelines, as they currently exist, do not appear to be the appropriate mechanism with which to control Ontario Hydro's prices. The Committee notes, with concern, that it appears possible for a firm such as Ontario Hydro to implement the largest rate increase in its history while apparently staying within the guidelines of the federal anti-inflation program.

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1 - See Exhibit E

III THE REVENUE AND COST STRUCTURE

Overall, the Committee has concluded that its investigations, to date, have revealed little in the revenue and cost forecasts for 1976 that could reasonably be changed as justification for a reduction in the 1976 rate. For its purposes, the Committee considered the forecast operating statement as being made up of four broad items as shown:

Revenue	$ 1,514	($ million)
Less:		
Energy Variable Costs	528	
Overhead	357	
Capital Charges	629	

A brief summary of the Committee's interim findings with respect to these items is as follows:

1. Revenues are made up of two components:

Primary power and energy	$ 1,402	($ million)
Secondary power and energy	112	
	$ 1,514	

The primary sales are those made to Ontario customers. In its preliminary investigation into the load forecasting procedure that produces an estimate of unit volume of primary sales, the Committee was presented with evidence of Hydro's remarkably good record of forecasting short-term demand. In addition, the consensus, at this time, seems to be that if there is an error in the forecast for 1976, the error will be on the high side - that is, sales are more likely to be lower than forecast in 1976, rather than higher.

Secondary sales are those sales made on an interruptible basis to utilities in the United States. The Committee spent some time inquiring into the feasibility of increasing secondary sales through the development of alternative selling proposals. The Committee found, however, that the slower than expected recovery of the U.S. economy has left the U.S. utilities with more generating capacity in relation to the new forecasts of demand than had earlier been anticipated. Now, not only is there little chance for increased sales but, for 1976, even those sales currently forecast appear to be somewhat uncertain.

In accepting Hydro's forecast of export volumes in 1976, however, the Committee was not convinced that alternative ways of approaching U.S. sales may not produce higher or more assured revenues in the future - as long, that is, as Ontario Hydro has generating capacity in excess of its needs.

Thus, while the Committee believes that this is an area where Hydro could take a more flexible and imaginative approach, there is no reason for believing that Hydro's actual revenues in 1976 are likely to be higher than forecast. Since only a higher volume forecast could produce justification for a lower bulk power rate, the Committee has concluded that no relief can be found for the 1976 rates in this area.

2. Energy variable costs are made up of eight components:

	($ million)
Coal, ignition and c.t. oil	$ 238
Oil for generation	54
Natural gas	71
Uranium	37
Steam	3
Purchased power	76
Nuclear agreement - payback	33
Water rentals	16
	$ 528

The Committee could find no justification for reducing the forecast of energy costs. In its examination of Hydro's energy costs, the Committee found that the 1976 projections were either: committed by previous contractual arrangements (purchased power, nuclear agreement and water rentals[1]); based on forecasts that appear to continue to be reasonable (natural gas, uranium); or, largely locked in by the process of accumulating inventories and accounting for consumption (coal, oil). The Committee found some evidence that small savings might be possible from coal and oil prices that may not rise quite as much as has been forecast, but concluded that any savings that might arise would be balanced out by a forecast of slight increases in coal consumption.

3. Overhead costs are referred to as operations, maintenance and administration and are forecast to amount to $357 million in 1976. Although the Committee is deeply concerned about the level of these costs, it could not, in the limited time available, probe deeply enough to find justification for changing Hydro's estimates. In reaching this conclusion, the Committee noted three important factors. First, the Ontario Energy Board in its hearings probed these costs and found no justification for reducing Hydro's estimate. Second, those areas of overhead cost that were drawn to the Committee's attention by some of the organizations that appeared before it did not, on preliminary investigation, appear to have significant possibilities for realistic cost reductions. Finally, the Committee found it difficult to justify an arbitrary cut, since in response to the peremptory directives contained in the Government's mini-budget, Ontario Hydro has already reduced its budget of overhead costs for 1976 by $30 million.

In accepting Hydro's 1976 forecast of operations, maintenance and administration costs, the Committee reiterates that it is not simply accepting that Hydro's overhead costs cannot be reduced. The Committee is firmly of the opinion that these costs should be subject to close and

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1 - The Committee notes that a renegotiation of the nuclear payback and water rental agreements could result in a lowering of energy variable costs. While recognizing the complexities involved, the Committee encourages Hydro to continue the current negotiations, and the Government to balance carefully the overall effect on Ontario residents of the current agreement as compared to any contemplated changes.

careful scrutiny by this Committee.

4. Capital charges are made up of five components:

	($ million)
Interest	$ 319
Depreciation	169
Debt retirement charge	86
System expansion charge	72
(Deficit)	(17)
	$ 629

The Committee spent most of its time examining this area of Hydro's forecast needs. Rather than deal with each component separately, the Committee focussed its attention on the overall adequacy of the revenues set aside to finance Hydro's capital needs in light of its proposed system expansion plan. The Committee concluded that this is the area of Hydro's operation that demands the closest scrutiny by the Legislature. Close scrutiny is required because, over time, the most significant impact on Hydro's rates results from its plans to spend over $30 billion on the expansion of its electric generation and transmission system. In addition, the critical assumptions on which the expansion program is based are fundamentally socio-economic-political choices rather than technical decisions.

The Committee heard many different points of view on the capital allocations and appropriation. Many questioned the specific methods of determining depreciation, debt retirement and system expansion charges. Hydro made a case for maintaining or improving its financial soundness, usually referring specifically to the ratio of long-term debt to equity. Senior investment bankers from Toronto and New York referred to two measures of financial soundness - the debt/equity ratio and the times interest earned multiple.

In looking at the overall adequacy of the capital charges, the Committee noted that the debt/equity ratio is forecast to continue to deteriorate through 1976 and the times interest earned multiple, while recovering from what will be a very bad year in 1975, will fall short of the standards deemed desirable by the financial community. The Committee decided that its standard of adequacy for capital charges would be the coverage of interest costs. (The actual cash outlay for interest expense, net of interest revenue, is about $555 million. This is far greater than the $319 million actually charged to operations.[1]) Hydro's forecast for 1976 is that, other than recovering from the current bad year, there will be no improvement in this ratio in 1976, so that it will remain below the standard of the financial community.

The Committee has not satisfied its many concerns about Hydro's planned system expansion program. The demand forecast, for example, does not assume any significant success in conserving electric energy use, although the Committee heard many interesting suggestions that could lead to less wasteful uses of electric energy. This is of particular concern in light of the evidence, albeit limited, that in other jurisdictions demand forecasts have been lowered. The reserve policies of Hydro also came under close questioning. The Committee, at this time, has been unable to weigh the relative risks and merits of lower reserve margins. Another area of inquiry was related to the mix of generating systems proposed in Hydro's plan. The Committee noted that generation mix decisions are related to such fundamental policy issues as the balance of short-term capital costs as against long-term operating costs, the worth to be assigned to security of fuel supply, the trade-off economy as against system reliability, and the prospect of tapping into the Baie James Hydro development.

Finally, serious questions were raised about the prospect that Hydro will not be able, or be allowed, to raise sufficient capital to fund

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1- Interest forecast in 1976:	Interest expense	$ 587 million
	Less: Interest income	32 million
	Interest capitalized	236 million
	Interest charged to operations	$ 319 million

its proposed plan. This must be weighed against the other view that an adequate supply of electric energy for Ontario in the future is of such importance that no predetermined financial restraint should be allowed to dictate the direction of the system expansion program. As well, the Committee dealt briefly with the appropriateness of today's users paying through their rates for a system that is at least partly being built for another group of users. This may be of particular concern at a time when the evidence indicates that shortages of oil and gas may require many energy consumers, currently enjoying the advantages of these relatively lower priced products, to switch to electric energy.

Overall, in the time available, the Committee was unable to make any determination of the appropriateness of Hydro's system expansion plans. The Committee was, however, concerned about the need for, and direction of, such a massive expansion program. It found that it must probe more deeply the fundamental and unanswered policy questions concerning future demand, reserve policies, generation mix and financing.

In this regard, the Committee has recognized that the most significant determinant of bulk power rates is the capital expansion program of Ontario Hydro. This Committee's terms of reference require it to review Ontario Hydro's proposals to increase bulk power rates for 1976. In order for this Committee to carry out its task adequately, realistically and responsibly, it must of necessity review the system expansion program as well as examine the possibilities relating to alternative forms of financing. In reviewing the Ontario Hydro proposals for 1976, this Committee's terms of reference instruct it to: "Review such other information as the Committee may consider relevant for its purpose." It has been the overwhelming and uncontradicted evidence of the various witnesses who have appeared before the Committee that nothing impacts on rates to a greater degree than the level of the system expansion program and the manner in which that program is financed.

Currently, the most significant source of revenue generation available to Ontario Hydro is its rate structure. The rate level, therefore, particularly in its relationship to the overall level of capital expenditures, must be reviewed as the Committee's terms of reference direct, with regard to the maintenance of Hydro's financial integrity. In order to do so, the Committee must review the appropriateness of the relationship between these figures and review further the appropriateness of each of its component parts. Again, this of necessity requires a review of the system expansion program.

Finally, in regard to the terms of reference, the Committee has not had the opportunity of reviewing the rates while having regard to the "dependence (the Province of Ontario may have) upon adequate electric supplies for Ontario's future economic well-being." This complex matter cannot be left unexamined in any review of rates. Rates cannot be reviewed in a vacuum.

The Ontario Energy Board has made it clear that it recognizes the social and economic influence which Ontario Hydro exerts as a result of the scale of its activities and the importance of electric energy. However, it has also recognized that neither it - that is, the Ontario Energy Board - nor Ontario Hydro is in the best position to deal with these basic socio-economic matters. For its part, Ontario Hydro has consistently stated that it is not its place to establish policies in these areas but rather that it is bound to accept and act upon these matters when so directed by the Government.

The results of this review will help the Committee and, through it, all the members of the Ontario Legislature and the people of Ontario, to understand more fully the rate process and the impact of alternative approaches in the broad socio-economic context.

Exhibit A

TERMS OF REFERENCE

Ordered, That a Select Committee of this House be appointed to review Ontario Hydro's proposals to increase bulk power rates for 1976, together with the report of the O.E.B. to the Minister of Energy thereon under section 37a of The Ontario Energy Board Act, dated October 10, 1975, and such other information as the Committee may consider relevant for its purpose, in light of the anti-inflation program of the Government of Canada; and the Ontario commitment to that program; and to prepare and submit a report before the end of December 1975, advising the Legislature whether, in the opinion of the Committee, such rate increase proposals are in keeping with or supportive of the anti-inflation program of the Government of Canada and the Ontario commitment to that program; and consistent with Ontario Hydro's obligation to provide power at cost; and if not, to report to the Legislature, with its recommendations.

In carrying out its terms of reference the Committee shall have regard to the following factors:

- Current economic conditions;
- Recovery of additional operating costs;
- Dependence upon adequate electricity supply for Ontario's future economic well-being;
- Maintenance of Hydro's financial integrity;
- Any provisions of the said program respecting increasing energy prices,

and that the Select Committee have authority to sit during the interval between sessions and have full power and authority to employ counsel and such other personnel as may be deemed advisable and to call for persons, papers and things, and to examine witnesses under oath and the Assembly doth command and compel attendance before the said Select Committee of such persons and the production of such papers and things as the Committee may deem necessary for any of its proceedings and deliberations, for which the Honourable Speaker may issue his warrant or warrants;

and the said committee to be composed of the following twelve Members: MacDonald, Chairman; Bullbrook, Deans, Drea, Gigantes, Grossman, Haggerty, Maeck, Peterson, Renwick, Williams and Wiseman.

And the said Committee may request such coverage of its proceedings by Hansard and the printing of such papers as the Committee deems appropriate.

Exhibit B

WITNESSES APPEARING BEFORE THE COMMITTEE

GOVERNMENT OF ONTARIO

Hon. W.D. McKeough	Treasurer of Ontario and Minister of Economics and Intergovernmental Affairs
Hon. Dennis R. Timbrell	Minister of Energy
R.M. Dillon	Deputy Minister of Energy
Dr. H.F. Button	Staff Ministry of Energy
Dr. B.A. Finlay	
Dr. A.E. Johnson	

ONTARIO ENERGY BOARD

Bernard Jackson	Chairman
G.W. Clayton, P.Eng.	Member
W.W. Stevenson, Ph.D.,	Member
Miss S.J. Wychowanec, Q.C.	Member

ROYAL COMMISSION ON ELECTRIC POWER PLANNING

Dr. A. Porter	Chairman

ASSOCIATION OF MAJOR POWER CONSUMERS OF ONTARIO

W.K. Voss

J.K. Shurrie

K.E. Winrow

K.H. Kidd

ASSOCIATION OF MUNICIPALITIES OF ONTARIO

Mrs. G. Rolling

MacD. Dunbar

G. Kaiser

R. H. Pope, C.A.

Exhibit B (con'd)

ONTARIO MUNICIPAL ELECTRICAL ASSOCIATION

A.J. Bowker

OTHER WITNESSES

B. Farrill	President, McLeod, Young, Weir and Company Limited
D.C.H. Stanley	Vice President, Wood, Gundy Ltd.
R.B. Schmult	General Partner, Salomon Brothers New York
J. MacKay	Vice President, Salomon Brothers New York
S. Longshore	Assistant Vice President Canada Permanent Trust
D. Cass-Beggs	Chairman, B.C. Hydro

ONTARIO HYDRO

R.B. Taylor	Chairman
D.J. Gordon	President
M. Nastich	Vice President, Resources
H.J. Sissons	Vice President, Distribution
H.A. Smith	Vice President, Engineering and Operations

P.G. Campbell

W. Cunningham

C.G. Fullerton

D.B. MacCarthy

J. Matthew

H.D. Smith

W. Winter

H.K. Wright

Exhibit C

ALLOWABLE RATE INCREASE - ALTERNATIVE I

- Bulk power revenue (1974)	$806,000,000	
- Bulk power cost excluding equity (1974)	$687,000,000	
- Bulk power net income (1974)	$119,000,000	
- Energy sold (1974)	78,288,000	MWH
- Actual income per MWH (1974)	$1.52	
- 1976 Forecast energy consumption	88,879,000	MWH
- 1976 Allowable net income 88,879,000 x $1.52	$135,000,000	
- 1976 Forecast bulk power costs excluding equity	$1,155,000,000	
- Allowable revenue (forecast)	$1,290,000,000	

$$\text{Rate Increase } \frac{\$1,290}{\$1,024} = 26\%$$

Note: 1976 revenue at 1975 rates (forecast) = $1,024,000,000

Exhibit D

ALLOWABLE RATE INCREASE - ALTERNATIVE II

Average net profit margin

$$= \frac{\text{net income (1970-74)}}{\text{total revenues (1970-74)}} = 10.52\% \qquad \text{Note 1}$$

95% of net profit margin

= .95 x 10.52 = 9.984% or 10%

As sales minus cost = net profit margin

$$\therefore \text{ Sales} = \frac{\text{cost}}{(100\%-10\%)} = \frac{\text{cost}}{.9}$$

	$M
- Forecast bulk power costs (1976)	$1,304
- Less forecast equity charges (1976)	149
	$1,155

$$\text{Allowable revenue} = \frac{\$1155}{.9} = \$1,283$$

$$\text{Allowable rate increase } \frac{\$1283}{\$1024} = 25.3\% \qquad \text{Note 2}$$

Note 1:	1970	Revenue $554	Net Income $70	% margin 12.6
	1971	Revenue $630	Net Income $58	% margin 9.2
($ million)	1972	Revenue $702	Net Income $54	% margin 7.7
	1973	Revenue $855	Net Income $100	% margin 11.7
	1974	Revenue $998	Net Income $126	% margin 12.6

Note 2: 1976 revenue at 1975 rates (forecast) = $1,024,000

Exhibit E

ONTARIO HYDRO

Comparison of Source of Funds 1970-74 with Forecast 1975-79

($000,000)

	1970-1974						1975-1979					
	1970	1971	1972	1973	1974	Total	1975	1976	1977	1978	1979	Total
Internally Generated Funds												
Net Income	70	58	54	100	126	409	12	141	161	333	500	1,147
Depreciation	75	91	105	121	143	534	153	187	233	271	324	1,168
Amortization of Frequency Standardization	16	18	21	28		83						
Other items - net	3	-	-	3	2	8	9	8	10	12	12	54
Total	164	167	180	252	271	1,034	174	336	404	616	836	2,366
% of Total Funds	30.9	31.9	32.5	27.0	31.9	30.5	11.8	16.4	17.4	24.3	29.4	21.1
Externally Generated Funds												
Net proceeds from bond issue	364	360	440	403	506	2,073	1,217	1,465	1,778	1,733	1,804	7,997
Debt incurred on purchase	-	-	-	253	-	253	-	-	-	-	-	-
Increase /(Decrease) in notes payable	2	(4)	(67)	26	71	30	80	250	140	190	200	860
Total	366	356	373	683	577	2,356	1,297	1,715	1,918	1,923	2,004	8,857
% of Total Funds	69.1	68.1	67.5	73.0	68.1	69.5	88.2	83.6	82.6	75.7	70.6	78.9

Source: Ontario Hydro, December 1, 1975

Appendix C

CHRONOLOGY OF HEARINGS

FIRST SESSION

Date		General meeting theme
November 4, 1975	Morning	Committee planning
November 5, 1975	Morning	Introduction
	Afternoon	Introduction
November 6, 1975	Morning	Committee planning
November 12, 1975	Morning	Capital availability. Discussion with Chairman of Royal Commission on Electric Power Planning
	Afternoon	Rate moratorium
November 13, 1975	Morning	Submission from Association of Major Power Consumers
	Afternoon	Rate moratorium
November 14, 1975	Morning	Committee planning
November 17, 1975	Afternoon	Submission from Ontario Municipal Electric Association
November 18, 1975	Morning	Rate moratorium. Staff presentation.
	Afternoon	Staff presentation
November 19, 1975	Morning	Discussion with members of Ontario Energy Board
November 20, 1975	Morning	Submission from Association of Major Power Consumers
	Afternoon	Submission from Association of Municipalities of Ontario
November 24, 1975	Afternoon	Staff presentation
November 25, 1975	Afternoon	Load forecasts
November 26, 1975	Afternoon	Fuel costs

Date		General meeting theme
November 27, 1975	Morning	System reserves
	Afternoon	Export sales. Interconnections
December 1, 1975	Afternoon	Committee planning
December 2, 1975	Morning	Presentation by Ministry of Energy
	Afternoon	5-10 year capital plan
December 3, 1975	Morning	Financing
	Afternoon	Financing
December 4, 1975	Morning	General presentation by D. Cass-Beggs
	Afternoon	Discussion with Chairman and President of Ontario Hydro
	Evening	Staff presentation
December 8, 1975	Afternoon	Discussion of first draft - interim report
December 10, 1975	Afternoon	Discussion of second draft - interim report

SECOND SESSION

January 20, 1976	Morning	Staff presentation
January 21, 1976	Morning	Statistical analysis of electricity use in Ontario. Conservation
January 22, 1976	Morning	Conservation. Load forecasts
January 27, 1976	Morning	Discussion with Chairman and President of Ontario Hydro. Anti-Inflation Program
January 28, 1976	Morning	Budgets
January 29, 1976	Morning	Budgets
	Afternoon	Budgets
February 3, 1976	Morning	Budgets
February 4, 1976	Morning	Budgets

Date		General meeting theme
February 5, 1976	Morning	Budgets
	Afternoon	Budgets
February 10, 1976	Morning	Staff presentation
February 11, 1976	Morning	Staff presentation
	Afternoon	Presentation by Ministry of Energy
February 12, 1976	Morning	Generation planning. System reliability
February 17, 1976	Morning	System reliability. Hydraulic generation
February 18, 1976	Morning	Alternative types of generation
	Afternoon	Visit to Richview Control Centre
February 19, 1976	Morning	Economics of alternative generation. Interconnections
February 24, 1976	Morning	Presentation by Dr. J.T. Rogers on load growth, conservation and the role of nuclear generation
February 25, 1976	Morning	Interconnections
February 26, 1976	Morning	Interconnections. Presentation by R.T. Tamblyn on energy management for commercial buildings
March 2, 1976	Morning	Presentation by A.J.G. Leighton on industrial conservation. Presentation by Sierra Club on conservation.
March 3, 1976	Morning	Presentation by Dr. D.B. Brooks on energy conservation
	Afternoon	Presentation by Ministry of Energy on energy management
March 4, 1976	Morning	Staff presentation. Presentation on industrial conservation
March 9, 1976	Morning	Presentation by Dr. J.W. Wilson on utility rate design and elasticity of demand

Date		General meeting theme
March 10, 1976	Morning	Staff presentation
March 11, 1976	Morning	Ontario Hydro costing and pricing study
March 16, 1976	Morning	Presentation by Dr. M. Fuss and Dr. L. Waverman on load growth and elasticity of demand
March 17, 1976	Morning	General presentation by D.W. Ross
March 18, 1976	Morning	Load forecasts
March 30, 1976	Afternoon	General presentation by R.A. Kampmeier
April 1, 1976	Afternoon	General presentation by C.E. Zwicker. General presentation by A.R. Scott
	Evening	Presentation by A.D. Patton on system reliability
April 20, 1976	Morning	Staff presentation
April 21, 1976	Morning	Discussion of staff presentation
	Afternoon	Discussion of staff presentation
May 26, 1976	Morning	Discussion of Hydro response to staff presentation
	Afternoon	Discussion of part of the first draft of the report
May 27, 1976	Morning	Discussion of part of the first draft of the report
	Afternoon	Discussion of part of the first draft of the report
June 1, 1976	Afternoon	Discussion of part of the first draft of the report
June 9, 1976	Morning	Discussion of part of the first draft of the report. Discussion of part of the second draft of the report.
	Afternoon	Discussion of part of the first draft of the report. Discussion of part of the second draft of the report

Appendix D

WITNESSES APPEARING BEFORE THE COMMITTEE

ONTARIO HYDRO

R.B. Taylor - Chairman
D.J. Gordon - President
M. Nastich - Vice-President Resources
H.J. Sissons - Vice-President Distribution
H.A. Smith - Vice-President Engineering

A.D. Allin - Director, Labour-Employee Relations
P.L. Baxter - Manager, Pension Fund
E.H. Burdette - Controller
P.G. Campbell - General Manager, Design and Construction
W.C. Cunningham - General Manager, Services
G.R. Currie - General Manager, Regions and Marketing
G.O. Davidson - Project Leader, Costing and Pricing Study
D.A. Drinkwalter - Chief Economist
R.E. Durham - Customer Applications
C. Elliott - Manager, Regional Operations
G. Fehreman - Manager, Budgeting Controls
C.G. Fullerton - Treasurer
M. Fraresso - Director of Stations, Transmission and Development
W.D. Gillman - General Manager, Computers
F.W. Gomer - General Manager, Finance
Dr. D.K. Grant - Director, Health and Safety
L. Higgins - Economist in charge of load forecasts
A. Jackson - Director, Generation Projects
J.W. James - Manager, Energy and Environment
K.J. Kane - Director, Data Processing
H.A. Kennedy - Director of Supply
G. Kileeg - Acting Director, Security
W.A. Lawson - Assistant Treasurer, Services
N.D. Lindsey - Director, System Maintenance
C.H. Lusk - Manager, Municipal Services
D.B. MacCarthy - Manager, Financial Forecasting
J.B. MacDonald - Manager, Power Marketing Analysis
E.M. MacKay - Project Co-ordinator
J.G. Mathew - Director, Fuels and Resources
K.R. McClymont - Manager, Transmission System Planning

L.G. McConnel	-	General Manager, Operations
G.M. McHenry	-	General Manager
G.F. McIntyre	-	Senior Planning Engineer, Resources
N.J. McMurtrie	-	Director, Property
J.K.A. Moore	-	Director, Computer Services
W. Morison	-	Director, Design and Development
F.M. Near	-	Hydraulic Developments Engineer
R.H. Nicholson	-	Director, Manpower Resources
A. Niitenberg	-	Director, Thermal Generation
G.K.F. Pepper	-	Manager, Customer Applications Department
E.G. Phillips	-	Manager, Computer Planning
J.S. Ridout	-	Manager, Programme Planning
W.L. Scott	-	Technical Service Engineer
L.V. Skof	-	Manager, Market Research and Statistics
H.P. Smith	-	Director, System Planning
R.H. Stewart	-	Rate Review Officer
H. Teekman	-	Manager, Resources Planning
J.H. Waghorne	-	Director, Research
O. Warrington	-	Manager, Financial Data and Information
G. Wellman	-	Administrative Assistant
H.G. West	-	Research Division
W.H. Winter	-	Operating Engineer
L.W. Woodhead	-	Director, Nuclear Generation
H.K. Wright	-	Director, Customer Services
M. Zabiuk	-	Manager, Management Services

GOVERNMENT OF ONTARIO

Hon. W.D. McKeough	-	Treasurer, Minister of Economics and Intergovernmental Affairs
Hon. D.R. Timbrell	-	Minister of Energy
Dr. H.F. Button	-	Executive Co-ordinator, Policy and Programme Development, Ministry of Energy
G.W. Clayton	-	Member, Ontario Energy Board
R.M. Dillon	-	Deputy Minister of Energy
Dr. B.A. Finlay	-	Senior Advisor, Nuclear Technology Group, Ministry of Energy
A. Frame	-	Senior Advisor, Utilities, Ministry of Energy
Dr. R.M.R. Higgins	-	Advisor, Solar and Wind Power, Ministry of Energ
B. Jackson	-	Chairman, Ontario Energy Board
Dr. A.E. Johnson	-	Co-ordinator, Energy Technology, Ministry of Energy
M. Rowan	-	Deputy Minister of Energy

Dr. I.H. Rowe - Senior Advisor, Energy Management Programme, Ministry of Energy
Dr. W.W. Stevenson - Member, Ontario Energy Board
J.J. Thacker - Executive Co-ordinator, Information and Analysis, Ministry of Energy
S.J. Wychowanec, Q.C. - Member, Ontario Energy Board

OTHERS

I. Adamson - Manager of Energy Resources, Polysar Ltd
J. Bennett - Sierra Club of Ontario
A.J. Bowker - Chairman, Power Costing Committee, Ontario Municipal Electric Association
Dr. D.B. Brooks - Director, Office of Energy Conservation, Department of Energy, Mines and Resources
D. Cass-Beggs - Chairman, British Columbia Hydro
J. Cullain - Manager of Utilities, International Nickel Company of Canada
Dr. D. De Wees - Sierra Club of Ontario
MacD. Dunbar - Executive Director, Association of Municipalities of Ontario
B. Farrill - President, McLeod, Young, Weir & Company Limited
Dr. M. Fuss - Associate Professor, Economics, Department of Political Economy, University of Toronto
N. Howell - Manager of Energy Management & Conservation, Carborundum Co.
G. Kaiser - Counsel, Association of Municipalities of Ontario
R.A. Kampmeier - Consultant
K.H. Kidd - Partner, Leighton & Kidd Ltd.
A.J.G. Leighton - Partner, Leighton & Kidd Ltd.
S. Longshore - Assistant Vice-President, Canada Permanent Trust
J. McKay - Vice-President, Salomon Brothers
A.D. Patton - Professor of Electrical Engineering, Texas A & M University
R.H. Pope - Consultant, Association of Municipalities of Ontario
Dr. A. Porter - Chairman, Royal Commission on Electric Power Planning
Dr. J.T. Rogers - Energy Research Group, Carlton University
G. Rollings - President, Association of Municipalities of Ontario

D.W. Ross - Consultant, D.W. Ross & Associates Ltd.
R.V. Schmult - General Partner, Salomon Brothers
A.R. Scott - Assistant Advisor on Electrical Energy, Department of Energy, Mines and Resources
J.K. Shurie - Vice-Chairman, Association of Major Power Consumers
H. Sochan - Manager of Engineering & Conservation, Polysar Ltd
D.C.H. Stanley - Vice-President, Director and Member of the Executive Committee, Wood Gundy Limited
L.R.L. Symmes - Chairman, Sierra Club of Ontario
R.T. Tamblyn - President, Engineering Interface Ltd.
W.K. Voss - Chairman, Association of Major Power Consumers
Dr. L. Waverman - Associate Professor, Economics, University of Toronto
B. Wenzl - International Nickel Company of Canada
Dr. J.W. Wilson - Consultant, J.W. Wilson & Associates
K.E. Winrow - Treasurer, Association of Major Power Consumers
C.E. Zwicker - Chief, Economic Studies Division, Electrical Energy Branch, Energy Policy Sector, Department of Energy, Mines and Resources

RECOMMENDATIONS OF THE COMMITTEE

IN THE ORDER PRESENTED IN THE REPORT

II-1 THE ONTARIO GOVERNMENT DEVELOP AND CLEARLY ARTICULATE GOVERNMENT POLICY TOWARDS ONTARIO HYDRO.

III-1 ONTARIO HYDRO DEVELOP AN ECONOMETRIC FORECASTING MODEL THAT WILL ACCOUNT FOR ALL QUANTIFIABLE VARIABLES THAT CAN BE ANTICIPATED TO HAVE A SIGNIFICANT IMPACT ON THE FUTURE DEMAND FOR ELECTRIC POWER.

III-2 ONTARIO HYDRO'S CURRENT LOAD FORECAST BE ACCEPTED AS THE BASIS FOR ANTICIPATING FUTURE DEMAND, GIVEN NO SIGNIFICANT CHANGES IN GOVERNMENT POLICY.

III-3 THE ONTARIO GOVERNMENT INCREASE INSULATION STANDARDS IN ALL NEW HOMES TO A LEVEL THAT IS JUSTIFIABLE ON THE BASIS OF EXPECTED FUTURE ENERGY PRICES.

III-4 THE ONTARIO GOVERNMENT MAKE FINANCIAL INCENTIVES GENERALLY AVAILABLE TO ENCOURAGE THE INSTALLATION OF ENERGY SAVING EQUIPMENT IN HOMES THROUGHOUT ONTARIO.

III-5 THE ONTARIO GOVERNMENT PUBLICLY URGE THE GOVERNMENT OF CANADA TO SET MINIMUM ENERGY EFFICIENCY STANDARDS FOR APPLIANCES AND TO REQUIRE ALL MANUFACTURERS TO SHOW ON EACH APPLIANCE NORMAL ELECTRICITY USE RELATIVE TO THE MINIMUM STANDARD.

III-6 THE ONTARIO GOVERNMENT SET INSULATION STANDARDS THAT CAN BE JUSTIFIED ON AN ECONOMIC BASIS FOR ELECTRIC WATER HEATERS.

III-7 ONTARIO HYDRO AND THE MUNICIPAL UTILITIES CEASE BULK METERING APARTMENTS AND TOWNHOUSES AND STUDY THE FEASIBILITY OF RETROFITTING EXISTING BULK METERED BUILDINGS.

III-8 THE ONTARIO GOVERNMENT MAKE AVAILABLE ADDITIONAL RESEARCH FUNDS FOR THE DEVELOPMENT OF ENERGY SAVING TECHNOLOGY.

III-9 THE ONTARIO GOVERNMENT MAKE FINANCIAL INCENTIVES GENERALLY AVAILABLE TO ENCOURAGE INVESTMENT IN ENERGY CONSERVATION-RELATED EQUIPMENT IN THE COMMERCIAL SECTOR.

III-10 THE ONTARIO GOVERNMENT ESTABLISH ENERGY EFFICIENCY STANDARDS AT AN ECONOMICALLY OPTIMAL LEVEL FOR ALL NEW COMMERCIAL STRUCTURES.

III-11 THE ONTARIO GOVERNMENT SET UP A REVOLVING CAPITAL POOL FOR INDUSTRY WHICH WOULD BE AVAILABLE FOR ENERGY SAVING PROJECTS.

III-12 THE ONTARIO GOVERNMENT TAKE THE LEAD IN INCREASING INDUSTRIAL ELECTRICITY GENERATION.

III-13 THE ONTARIO GOVERNMENT ENSURE THAT THE OVERALL LEVEL OF ELECTRIC RATES SHOULD NOT BE INCREASED SOLELY FOR CONSERVATION PURPOSES.

III-14 ONTARIO HYDRO, THE ONTARIO GOVERNMENT AND THE ONTARIO ENERGY BOARD CONSIDER THE EFFECTIVE AND EFFICIENT USE OF ELECTRIC ENERGY AN ISSUE OF EQUAL IMPORTANCE TO THE CONTINUANCE OF A RELIABLE AND ADEQUATE SUPPLY. FURTHER, THAT ONTARIO HYDRO'S SPECIFIC CONSERVATION TARGETS BE ACCEPTED AS A GOVERNMENT COMMITMENT AND BE INCLUDED IN ALL SYSTEM EXPANSION PLANNING.

III-15 ONTARIO HYDRO CONSIDER THE DESIGN OF ITS RATES TO BE AN IMPORTANT TOOL IN FURTHERING REASONABLE LOAD MANAGEMENT OBJECTIVES.

III-16 ONTARIO HYDRO AND THE MUNICIPAL UTILITIES ACTIVELY PROMOTE THE SALE OF INTERRUPTIBLE POWER TO INDUSTRY AND ENSURE THAT THE PRICING OF INTERRUPTIBLE CONTRACTS REFLECTS THE REAL SAVING TO ONTARIO HYDRO.

III-17 THE ONTARIO GOVERNMENT AND ONTARIO HYDRO DEVELOP AND IMPLEMENT A LOAD MANAGEMENT PROGRAM.

III-18 ONTARIO HYDRO DEVELOP IMMEDIATELY A PROGRAM SPECIFICALLY AIMED AT REDUCING PEAK DEMAND BY A TARGET AMOUNT OF ONE PERCENT PER ANNUM TO 1985.

III-19 ONTARIO HYDRO DEVELOP A MEASURE OF THE RELIABILITY OF THE GENERATION SYSTEM THAT INCLUDES ALL SIGNIFICANT VARIABLES, AND INDICATES WITH THE HIGHEST POSSIBLE DEGREE OF CLARITY AND ACCURACY THE FREQUENCY, DURATION AND SCALE OF PROBABLE OUTAGES.

III-20 ONTARIO HYDRO RETAIN, AS AN INTERIM MEASURE, THE CURRENT LOSS OF LOAD PROBABILITY STANDARD OF ONE OUTAGE IN TEN YEARS.

III-21 ONTARIO HYDRO ASSIGN A REASONABLE VALUE TO THE INTERCONNECTION SYSTEM IN PLANNING THE NEW GENERATION REQUIRED TO MEET THE RELIABILITY STANDARD.

III-22 ONTARIO HYDRO CHANGE ITS PLANNING PROCESS TO EMPHASIZE MEETING ONTARIO'S ELECTRICAL ENERGY NEEDS AFTER IMPLEMENTATION OF CONSERVATION AND LOAD MANAGEMENT PROGRAMS, WITH THE MINIMUM AMOUNT OF NEW GENERATION THAT IS CONSISTENT WITH SOUND PLANNING.

III-23 ONTARIO HYDRO ACCEPT THE COMMITTEE'S EARLIER RECOMMENDATIONS AND FURTHER REDUCE ITS TARGETS FOR ADDING GENERATION IN THE NEXT TEN YEARS.

III-24 ONTARIO HYDRO DEVELOP A NEW GENERATION PLAN THAT BRINGS ITS PLANNED GENERATION ADDITIONS DOWN TO THE COMMITTEE'S TARGET LEVELS AT THE EARLIEST, ECONOMICALLY FEASIBLE TIME.

III-25 THE ONTARIO GOVERNMENT ACCEPT RESPONSIBILITY FOR LAUNCHING AND DIRECTING A PROGRAM THAT WILL ENSURE ONTARIO IS MAKING OPTIMAL USE OF BY-PRODUCT HEAT ENERGIES FROM THERMAL ELECTRIC GENERATING STATIONS.

III-26 ONTARIO HYDRO, IN DEVELOPING A NEW GENERATION PLAN, ENSURE THAT SMALL HYDRAULIC SITES ARE USED WHEREVER FEASIBLE, AND THAT THE POTENTIAL OF SOLAR ENERGY IS APPROPRIATELY TAPPED.

III-27 THE ONTARIO GOVERNMENT ACCEPT RESPONSIBILITY NOW FOR TAKING ALL NECESSARY ACTIONS TO ENSURE THAT ONTARIO RECEIVE THE MAXIMUM REASONABLE BENEFIT FROM THE HYDRO-ELECTRIC POTENTIAL OF THE JAMES BAY WATERSHED.

III-28 THE ONTARIO GOVERNMENT APPOINT A SELECT COMMITTEE AS THE APPROPRIATE PUBLIC FORUM TO EXAMINE HYDRO'S NUCLEAR COMMITMENT.

III-29 (i) THE ONTARIO GOVERNMENT ACCEPT THE THRUST OF THE COMMITTEE'S REPORT AS GOVERNMENT POLICY AND INSTRUCT HYDRO TO BEGIN IMMEDIATELY TO IMPLEMENT THE COMMITTEE'S RECOMMENDATIONS. (ii) THE MINISTRY OF ENERGY COORDINATE THE GOVERNMENT POLICY AND MONITOR HYDRO'S IMPLEMENTATION ON AN ONGOING BASIS. (iii) THE ONTARIO GOVERNMENT APPOINT A SELECT COMMITTEE OF THE LEGISLATURE TO WHOM HYDRO WILL REPORT ON A PERIODIC BASIS ON ITS NEW SYSTEM EXPANSION PLAN AND ITS IMPLEMENTATION OF THE COMMITTEE'S RECOMMENDATIONS COMMENCING IN THE SPRING OF 1977.

IV-1 THE ONTARIO GOVERNMENT ENSURE THAT HYDRO'S BULK POWER RATE INCREASES COMPLY WITH THE GENERAL INTENT OF THE ANTI-INFLATION PROGRAM.

IV-2 THE ONTARIO GOVERNMENT ENSURE THAT THE MAXIMUM PERMISSIBLE INCREASE WITHIN THE INTENT OF THE ANTI-INFLATION PROGRAM NOT SERVE AS THE ONLY CONSTRAINT ON FUTURE BULK POWER RATE INCREASES.

IV-3 THE ONTARIO GOVERNMENT RECONSIDER THE APPROPRIATENESS OF CHARGING ONTARIO HYDRO FOR WATER RENTALS AT HYDRO'S HYDRAULIC GENERATING STATIONS.

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IV-6 ONTARIO HYDRO REDUCE THE HIGH LEVEL AND RATE OF GROWTH PREDICTED IN OM&A BUDGETS BY PUTTING NEW EFFORT INTO IMPROVING PRODUCTIVITY, CUTTING COSTS, AND INCREASING THE EFFICIENT USE OF ITS PLANT.

IV-7 ONTARIO HYDRO MODIFY ITS BUDGET PROCESS TO HIGHLIGHT PERFORMANCE AND TO MAKE THE TIMING OF THE PROCESS MORE RESPONSIVE TO THE CURRENT FINANCIAL ENVIRONMENT.

IV-8 ONTARIO HYDRO ESTABLISH CLEAR GUIDELINES FOR CAPITAL EXPENDITURES, AND PROCEDURES TO ENSURE THE EFFECTIVE CONTROL OF THE RATIONING OF CAPITAL TO PROJECTS.

IV-9 ONTARIO HYDRO CONFIRM FOR THE BALANCE OF 1976 THE BULK POWER RATE INCREASE OF 22 PERCENT RECOMMENDED IN THE COMMITTEE'S INTERIM REPORT.

IV-10 ONTARIO HYDRO EXERCISE ITS FULL REGULATORY AUTHORITY TO MINIMIZE THE IMPOSITION OF LARGE ANNUAL RATE INCREASES AT THE LOCAL LEVEL.

Appendix F

RECOMMENDATIONS OF THE COMMITTEE FOR THE ONTARIO GOVERNMENT

II-1 THE ONTARIO GOVERNMENT DEVELOP AND CLEARLY ARTICULATE GOVERNMENT POLICY TOWARDS ONTARIO HYDRO.

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